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MARCH 1946

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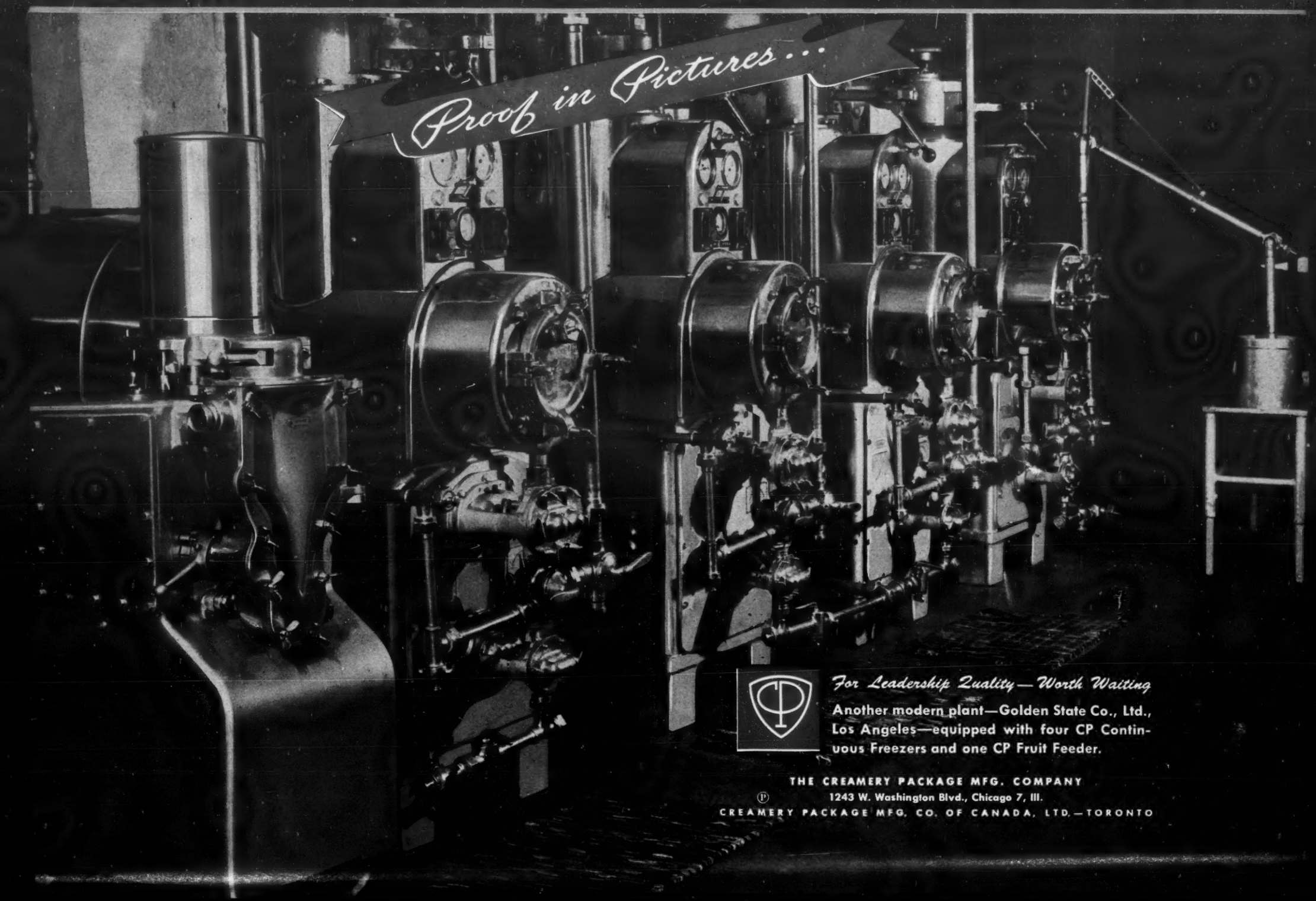
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THE COVER

A 2-lb. block of dehydrated carrots is being removed from the hydraulic press. A force of 1,200 psi. was exerted on this block. When reconstituted it will produce about 25 lb. of dehydrated carrots. A. L. Pitman, Senior Chemical Engineer, Western Regional Research Laboratory, U. S. Department of Agriculture, Albany, Calif., is shown removing the block from the press.

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Food Crisis – Nothing New

IF anybody was surprised at President Truman's statement on February 6 that a world food crisis had developed—the worst in modern times—he must have been one who reads only the funnies on the sports pages. For, the crisis has been several years in the making.

To be sure, the government's publicity on the crisis has been as abrupt as the sudden cutting off of lend-lease without warning. But anyone with average intelligence should have been aware of world conditions. The only reasonable doubt should have been how far America would go in sharing its present supply of food. America is not, nor has it ever been, the limitless source of food that some persons, both here and abroad, have fondly imagined.

Well over a year ago, Sir John Russell, British agriculturalist, reported that Europe was one vast worn out farm. Severe droughts have afflicted Australia and South America in recent years. The Japs, in full possession of the phosphate islands, Nauru and Ocean Island, kept the Allies from this important fertilizer. Shipping was too scarce during the war to permit adequate imports of fertilizer to many lands that were not ravaged by combat. Droughts also existed in Africa, the western Mediterranean countries, the West Indies, and India.

The fact that the United States is to share with other nations should not be disquieting to anyone, other than its inevitable effects on the 1946 plans of individual processors. A legitimate cause for concern is, however, the cosmic forces that cause the droughts. The most probable explanation of periodic droughts is that the variations in radiation from the sun cause important changes in the type of weather. If this explanation be true, there is no reason to expect that the Northern Hemisphere should be exempt from droughts when the southern half is so afflicted. The same sun shines on both hemispheres.

While a resumption of rationing, or mere shortages of certain foods, may be annoying, a real cause for trouble would come only if there should be a major crop disaster in the Northern Hemisphere during the coming season. Though there is no basis for a prediction, it is well-known that the United States has had phenomenally good growing weather for many recent years. The averaging-up process must come sometime. The longer it is deferred, the more drastic it is likely to be. Let us hope that our national effort to help stave off world hunger will not be offset by crop shortages.

IT IS only common sense that we share our food resources with Europe. The lesser cost of peace versus the ruinous cost of war are the alternatives. For mankind has the unhappy tendency to revolt against law and order when hunger comes, even though a change in government cannot create food. Dr. John M. Cassels set forth the problems of Europe in January Food Industries, based on a year-long study on the ground. His article deserves re-reading now.

REPERCUSSIONS on American food processors of the food sharing program will be many and varied. In addition to President Truman's statement of February 6 that: (1) Exports of grain and protein food must increase, (2) feeds available to sustain all forms of livestock will decline, and (3) a probable temporary increase of marketings of livestock is to be expected; there are other aspects to be considered. These considerations are largely negative—the subtractions from our food supply.

On the positive side—namely, what we can do to augment domestic human food resources—there are great possibilities for the increased production of direct consumption foods from fruits and vegetables. A quick appraisal of the future indicates that canning, freezing and dehydration of vegetables and fruits will receive a demand as great as any imposed by the war. Every source of protein human foods, including fish, the soy bean and yeast must be pushed for at least a year—even longer if weather is unfavorable for crop production in war-ravaged nations.

The immediate outlook is a food crisis different from any within memory, for it involves a shortage of carbohydrates. While it is too soon to see the detailed future clearly, the general trend of events should be apparent to all. Barring adverse weather in North America, the crisis can be met successfully.

K. V. Burton EDITOR

The Talk of the Industry

• OVER 300,000 copies of U. S. Patents have been purchased by Russia in recent months, according to Commissioner of Patents Casper W. Ooms.

Lend-lease or cash?

• BUTTER people think that consumers should eat butter, merely because it is butter. This was the burden of recent remarks by one of America's leading dairy scientists. The way to get people to eat butter, or eat more butter, is to make it of better quality and keep the price down, he continued. Instead of any 88 to 90-score butter the industry should be producing 93-score at all times. The makers of substitutes for butter never make the comparable error of selling anything that is off-grade.

It is indeed gratifying to hear such commonsense remarks from one who has spent his life's work on dairy products.

• FIGHTING in the Dutch East Indies between Javanese and Dutch, aided by British forces, bodes ill for any prompt tin, rubber or spice shipments from that area. Two important tin sources are the islands, Banka and Billiton, both formerly under Dutch control. Little news other than about fighting reaches us from any of these Dutch islands. What it all means is not at once clear, but here are two straws in the wind:

An Australian Commando officer who held off the Japs on Timor for over a year said he lost more men by the action of the natives in Dutch Timor than by that of the Japs. Natives in the Dutch end of the island so hated all white men that they killed them indiscriminately. Not so in the Portuguese end of Timor. Dutch colonial policy had not won the regard of the natives as had that of the Portuguese.

A Javanese officer in Sydney in 1944 told in halting English that his countrymen were much impressed by what the United States had done in the Philippines: "Why does not the U. S. take over Java, educate us for democracy, and then grant us our independence just as you have promised the Philippines?"

If the Netherlands' past policies in the East Indies has created this revolution, and if it is not quickly quelled, it looks as if tin, sugar, rubber, spices and cassava may not be forthcoming for a long time.

• ONE curious effect of the steel strike was to stop the manufacture of paper milk containers for store delivery at the Brooklyn, New York, plant of American Can Company. The workers were members of United Steel Workers of America—CIO. Yet, only a few miles away in Jersey City, New Jersey, another plant of the same company also making paper milk containers, was manned by AFL union members who were not on strike.

• A LEARNED Chinese caller, seeking American advice on how to set up a food administration for China, has suffered continued disappointment. No one seems to have been able to help him.

Possibly it is because others, like ourselves, have been unable to create extemporaneously such an enormous organization for a population three times that of the United States in a land so lacking in the facilities which we regard as indispensable.

In retrospect, it seems that the best advice one could have given to China is to keep first things first. To have a food administration there must be something to administer—not only food, raw materials, but also roads, highway transportation, railways, processing plants, grain elevators and cold-storage freezer-storage warehouses. In short, China must have a food industry. Yet this also requires the existence of other industries that supply the food industry, box factories, paper mills, glass factories, can factories, bag makers and so on back to the basic industries. China lacks so many of these that we fear the unhappy man's fruitless quest is simply due to the plain fact that he should wait 10 or 20 years for the partial industrialization of China before a food administration can be set up.

Hors d'Oeuvres

• *March is National Bread and Gravy month, according to Wilson & Co. The President has decreed 80 percent extraction flour for the bread, but the CIO-AFL has yet to determine the strength of the gravy.*

• Breweries in Japan were only slightly damaged by air raids while breweries in Germany were damaged not at all. Want to argue about accuracy?

• *A single fluorescent lamp requires* 1,000 *distinct manufacturing operations and is assembled from* 36 *separate parts. In no other way, however, does it resemble either chili sauce or sausage.*

• Up in British Columbia it is said that trolling may bring an independent fisherman a profit of about $50 per day. All it ever brought us was a $10 fine, up in Wisconsin—and we made no gesture toward independence.

• *Out in Cleveland, the Red Robin Frozen Food Co., expects to start selling door-to-door on* 30*-mile routes covered by trucks equipped with air horns that toot, "When the Red, Red Robin Comes Bob, Bob Bobbin Along." Dairy operators might easily adapt this idea to a "moo" on their Klaxons, but the bakers will have trouble. The sound of Kansas wheat thundering up through the ground is going to be very hard to imitate.*

• A sensitive electric device, which can measure even a pindrop, has proved that the old-fashioned polka causes 30 percent more vibration than jitterbugging. This is a good thing for sauerkraut and wine makers to know.

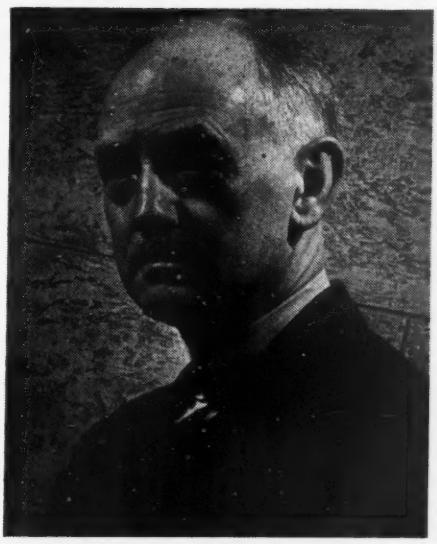
• *Hirohito declares he's only a mortal. This confirms reports appearing in this column, from time to time, during the past four years.*

• The California Packing Co. is paying off the last $5,500,000 of a $7,500,000 loan it made in 1941. Good thing to get those tag ends of a debt cleared up.

• *The National Potato Chip Institute reports that in 1945 they chipped 649,535,789 lb. of potatoes. They might have at least revealed the number of chips to the pound so that us statisticians could round out the picture for you.* J. A. J. J.

Some Recent Developments In Human Feeding*

Britain's health steadily improved under the starkly plain wartime diet, directed by Sir Jack. And, a nutritional discovery of the war—spray-dried separated milk—salvaged Holland's almost starved population



By SIR JACK DRUMMOND
D.Sc., F.R.S.
Scientific Adviser,
British Ministry of Food, London

FOR centuries the world has suffered from the influence of a school of thought that pronounced the doctrine that mankind will degenerate if not revitalized and rejuvenated by the experience of war. The true democracies know how to appraise such a philosophy but, nevertheless, it is undeniably true in our own experience that war can be a powerful stimulus to the acquisition of knowledge likely to prove of permanent value to the human race. It is a sad reflection on our peacetime mentality that this should be true, but, nonetheless, we have to realize that immense benefits will accrue to humanity from the powerful intensification of scientific investigation that was a direct outcome of the recent war.

I wish to bring to your attention here some of the lessons we have learned from engaging the many and difficult problems of feeding the nations during the past six years. I shall confine my statements to conditions in western Europe because I can speak from personal experience of them, conditions that showed every gradation from those permitting a planned and adequate nutrition on limited supplies to those amounting to sheer starvation.

A short review of food conditions in Great Britain forms a useful background to our general survey of western Europe. Before the war, the nutritional picture presented by my country was in general similar to that seen in most of the other European countries. There were grave disparities of consumption, particularly of the more highly nutritious foods, meat, eggs, milk and fruit, between the population groups divided according to their ranges of income. Sir John Orr's surveys had indicated that approximately one-third of the population did not get enough food, or the right foods, to insure good health. To a large extent this was due to poverty, but ignorance and bad eating habits were also to blame. This grave fault in the national structure was also seen before the war, in all the European countries of which I shall write, and it still continues to be a source of danger in many other lands.

And, yet, if one examines the food supply that was available to the people of Great Britain before the war it is soon apparent that, with a few exceptions, it was sufficient to provide everyone with enough for good nourishment, provided consumption was based on physiological need and was not determined by the family income. I have said that there were a few exceptions. The general use of a low-extraction white flour was largely responsible for an overall deficiency of thiamin, while a relatively low consumption of milk was reflected by a low-average calcium intake. There were also indications of a general vitamin A intake that could have been improved. It is against this background that we must attempt to project the problems of wartime nutrition.

It was realized very early in the war that the pattern of our food supply would be materially changed. Much more economical use would have to be made of shipping. Many cargoes of low nutritive value in terms of stowage space would have to be cut out of our import program. Inevitably, our consumption of the more desired foods—meat, fats and sugar—would fall and that of bread and vegetables would rise. The diet would tend to become increasingly vegetarian in character and less palatable to the ordinary person. But there was no reason why it should not be nutritious.

I do not need to remind you how many races there are whose fine physique and endurance is associated with eating quantities of animal food that are very small by our standards. What you may not know is that the Red Army fought its way from Stalingrad to the heart of Germany on rations of millet, cabbage, black bread and a little dried fish.

When Goering made his notorious speech offering the Germans guns in place of butter, he was making but one move in a concerted drive that had as its object the conditioning of the people for war. They were to be gradually weaned on to a more primitive and peasant type of diet as part of that plan. And, that part of the Nazi scheme was sound.

Although it was realized that our diet in Great Britain would tend to

*An address before a combined meeting of the New York Sections of American Association of Cereal Chemists, Metropolitan Dairy Technology Society, and Institute of Food Technologists, December, 1945. Owing to a severe illness the manuscript of Sir Jack's address could not be obtained until late January.

become more vegetarian as the war progressed, we did not fear until the winter of 1940-41 that we might be forced to live entirely on home-produced food. That was a grim period of the war for us. The submarine warfare was succeeding to an alarming extent, our supplies from Europe were no longer available, our foreign exchange was almost depleted and our extensive plan for agricultural expansion had hardly began to operate.

Potatoes, vegetables and bread made up the bulk of the British diet during the war years. It was a job to maintain interest in such an eating program, but the British responded with such diversions as this exhibition of the many ways of serving unrationed potatoes.

Vegetarian Diet

The Medical Research Council thought it prudent to find out to what extent it would be practicable to feed the people entirely on home-produced food. Accordingly, a group of volunteers at Cambridge lived for many weeks on a diet consisting to a very large extent of bread of 92 percent extraction, potatoes and vegetables, including those usually employed only for feeding livestock.

It was a formidable task to eat the bulky meals necessary to provide the calorie requirements of the subjects, but, by and large, the experiment was a success. It was found that such a diet was compatible with good health and physical fitness. The volunteers did hard work without fatigue or discomfort. Their only complaint was excessive flatulence.

Fortunately, we were never driven to the necessity of putting the Cambridge experiment to practical use. The spring and summer of 1941 brought a great improvement in the food situation. The submarine menace was reduced and lend-lease supplies began to arrive. But throughout the war we have always had in mind the nutritional security that a diet based on long extraction bread, potatoes and mixed vegetables will provide.

This aspect of our nutrition problems has often brought up the question of man's minimum need for animal protein and for fat. Unfortunately, our wartime experience has left this question unanswered, so far as the purely nutritional aspect is concerned. We are still unable to say how much of these two nutrients should be present in a well-balanced diet. I, personally, do not think we shall ever agree on a figure for animal proteins, but I hope before long we shall be able to derive from the brilliant studies of such investigators as Professor W. C. Rose and Professor H. H. Mitchell, estimates of the need of the body for individual essential amino-acids. When we have such figures and when the improved methods for determining amino-acids in food proteins have given us much needed analytical data, discussions of the need for animal protein will become superfluous. As for fat, we are still a long way from having a picture of its function in the human diet.

Fat and Protein

But in another direction our wartime experience has thrown light on the animal protein and fat problem. For people accustomed to the sort of food we eat in normal times there are minimums for both foods below which it becomes very difficult to provide palatable meals. That has been very clearly apparent in Great Britain as well as in other western European countries. When the housewife has so little meat, fish, eggs and cheese, from the rations, that they provide only about 25 g. of animal protein daily and when the fat ration is less than 1 oz. a day, the family is obliged to eat meals that are dull and unappetizing. That is a fact no less important than are the purely nutritional considerations. Indeed, in my experience, these psychological aspects are frequently more important than are the physiological. The long subsistence on small rations of these desirable foods (and let me remind you that we at home are faced by strict rationing of meat, eggs, cheese, butter and margarine until the world supply situation justifies relaxation of control) cannot fail to have a depressing effect on people who have put their all into the war effort during the past six years.

Vitamin Problem

An interesting and important point emerged from our early studies of the nutritional adequacy of a diet largely vegetarian in character. It concerned the need for vitamins. In the early stages of the war we were under considerable pressure, from various directions, to enrich foods with vitamins and to produce or obtain large stocks to be distributed as tablets or in capsules when occasion arose. We had to decide, then and there, what should be done. The demand for labor and material for construction of essential war factories was enormous at that time and only a vital need would have justified priority being given to vitamin manufacture. Our analysis of the situation showed, however, that if we could give the public a nutritious bread and if we could considerably increase the production and consumption of potatoes and vegetables of high vitamin A content, there should be no fear of vitamin deficiency. All but two vitamin projects were accordingly rejected. Vitamins A and D were added to margarine, so as to make it and butter equivalent nutritionally, and interchangeable if necessary, on the ration. Stocks of ascorbic acid were acquired under lend-lease and were laid down against the contingency that the potato crop might fail and cause a general deficiency of vitamin C.

Milk's Role

So much for that aspect of the broad nutritional picture. There were other important matters. If supplies of certain staple foods were likely to be short, distribution had to be equitable and based on physiological need. By rationing and controlled distribution on the one hand and by price control and subsidies on the other, it was possible throughout the war for families of every income level to obtain fair shares, and

no more, of the staple commodities. Rations were invariably honored and black market transactions were on a negligible scale. Special provisions were made for mothers and children, because it was agreed early in the war that everything possible should be done to protect the younger generations from adverse effects of wartime restrictions. This involved a remarkable change in the distribution of milk. Before the war, the well-to-do families consumed much more milk than the poorer people, the diet of the latter being characterized by low-calcium intakes. During the war the government introduced a national milk scheme, by which every pregnant woman, nursing mother, and child up to the age of five was entitled to a pint of milk daily, either at the reduced price of 2d, or free if family circumstances indicated the need. Closely related to this was a vitamin scheme, which gave the woman or the young child concentrated orange juice and either cod liver oil or an alternative source of vitamins A and D, in quantities sufficient to provide a large proportion of the day's requirements. These two schemes have proved very popular. At the present time the uptake under the national milk scheme is nearly 100 percent.

For the older children there has been a great expansion of two schemes, in operation before the war, by which they were provided with cheap or free milk and with meals. Today, about 75 percent of the school children get at least one-third of a pint of milk daily, while the proportion who enjoy a good nutritious meal is about 40 percent in elementary and 60 percent in secondary or private schools. The rate of expansion of the provision of meals has been restricted by shortage of space, equipment and trained cooks, but it is now anticipated that these difficulties will be less formidable and that the target of hot meals for 75 percent of the children in all schools will be achieved by the end of 1946.

Government Support

The government is backing this in a wholehearted manner. It bears the entire cost of kitchen facilities provided by the local authorities, who, under a recent act, are now obliged to provide them, whereas formerly participation in the school-meals scheme was optional.

The national milk scheme and the milk-in-schools scheme absorb a great deal of milk. Production in Great Britain is much the same as it was before the war, but consumption has risen by about one-third. The quantity used to make cheese and processed products has fallen proportionately. Of the total liquid milk consumed, the priority classes, who represent about one-third of the population, drink no less than 56 percent. Today, in striking contrast to the prewar days, the curve relating milk consumption to income spent on food does not rise sharply; it is tending to become horizontal, as it should.

I would like to describe in detail other features of our wartime food plan, but space forbids. I will, however, briefly refer to the expansion of the provision of canteens in factories. The remarkable success of this government-sponsored scheme has enabled us to sidestep the very difficult problems of differential rationing. In all other European countries during the war, special rations were given to various groups of workers. Such rationing schemes are fraught with difficulties and even with danger. They must be imposed if all the staple foods are rationed, as was the case in those countries, but if a satisfactory alternative can be found, the path of the administrator is much easier. Fortunately, we were able to maintain unrationed supplies of bread and potatoes. In these we had an invaluable energy pool. However short of meat and fats we might be, bellies could always be filled and the calories for physical needs could be supplied by bread and potatoes. A sound rationing plan needs to be based on at least one cheap source of energy available to all, without restriction. We came near to rationing both bread and potatoes at dark moments in the war but the grim threat passed. It was through our factory canteens that we were able to allocate small additional rations of meat and sugar to industrial workers. In 1939, there were

Although Holland's people have been liberated, they are still suffering from the effects of the Nazi occupation. Scenes such as the one on the left were caused by widespread separation of families and loss of means of livelihood. At the right, milk cans are being used to distribute hot soup to Dutch refugees in Nijmegan. It was in Holland that starvation of a whole people came the closest to reality.

only 1,500 such canteens, in 1944 there were about 19,000. In all of them, good nutritious meals are served and no one who has seen them in operation can doubt that they have played a very large part in maintaining the health of the factory hands during years of hard stress and strain.

High Extraction Flour

Reference must be made to two important changes in the character of the bread supply. In 1941, a flour of 85 percent extraction was introduced and it was enriched with calcium carbonate. The use of this flour dispelled at once all trace of the thiamin deficiency that analysis of the prewar food supply had revealed. The addition of calcium, made primarily to offset any interference with absorption of that element caused by phytin acid of bran, brought about a general rise in the intake that reassured nutrition experts. By and large, the introduction of their calcium-enriched flour raised the average daily intakes of thiamin and calcium by 0.3 mg. and 180 mg., respectively. Moreover, the longer extraction of the flour brought about a material improvement of the figures for riboflavin, niacin and iron. Indeed, some eminent authorities are inclined to believe that this relatively iron-rich flour played a big part in bringing about the fall in the incidence of anaemia that the war period has seen. The extraction level of the flour has been reduced to 80 percent as a consequence of the results of investigations at the Ministry of Food Cereal Research Station. These showed that, by a slight modification of the ordinary milling procedure, it is possible to produce a flour of nutritive value not greatly below that of the 85 percent product and at the same time of a color and quality acceptable by the general public. This flour is now in general use.

Check on Health

We have tried to keep a check on the state of health of the people during the war period. Dietary surveys are conducted in representative areas every month in order to ascertain the trend of consumption, the nutritive value of the food eaten and the prices paid for it. The results of these monthly surveys are reassuring. They reflect the equitable distribution of essential foods. There is, for example, a negligible difference between the nutritive values of the food eaten by the low and by the middle income groups. They also show that expenditure on food is being well-balanced in respect to the controlled cost-of-living index.

Then we have clinical surveys to examine the nutritional conditions of the people. Again we concentrate our attention on the low income groups because, if we find them well, there is no cause for anxiety about those who are better-off. These surveys have revealed a state of affairs that is generally satisfactory. Vitamin deficiency conditions are rarely encountered, anaemia appears to be less common than before the war, children's development may be better, but is at least as good as it was in 1939 and the condition of their teeth is improving.

Improved Health

Our most encouraging evidence of well-being under wartime conditions comes from our vital statistics. All show marked improvement since 1941, which marks the point where many of the special measures began to operate. Maternal mortality has dropped to the lowest figure on record, 2.3 per 1,000 births; infant mortality has also touched a record low figure. The birth rate is rising sharply after falling steadily for many years past, and the death rate is less than it was five years ago.

I have taken some time to outline the broad picture in my country because, as I remarked earlier, it provides a useful background against which to project the situation as it changed in western European countries under German occupation and after liberation.

Following the invasion of these countries by the German forces, there was a period during which everything went to pieces. It is not surprising, therefore, that many people were seriously short of food during the winter of 1940 and the spring of 1941. It is true that, at that time, there was widespread malnutrition in France and Belgium and that that grim spectre of starvation and hunger oedema (dropsy) made its appearance. But it was not long before the situation was materially improved. Food distribution and rationing were reestablished, special measures were introduced for protecting the mothers and young children and provisions were made for other special categories, such as industrial workers.

Looking back at 1942 and 1943, one recalls a good deal of uncertainty regarding the nutritional situations in western European countries. We knew what were the official rations and we also knew that, by and large, the rationing system was working reasonably well.

There was also evidence that children were being looked after as well as circumstances permitted. Nevertheless, from time to time, alarming reports reached the free world to the effect that malnutrition was widespread. As you know, agents passed from England to the continent and back with the regularity of a courier service and yet, surprisingly, the

(*Turn to page* 220)

Long food queus were an everyday experience for the London populace, but the nutritional intake was higher and more widely distributed than at any time in England's history.

Grapes Unloaded Mechanically

By ZE'EV HALPERIN, Chief Chemist, Petri Wine Co., Escalon, Calif.

How an inexpensive change in the design of truck bodies eliminated hand labor in the unloading of grapes and resulted in greater efficiency and economy of operation

CALIFORNIA winery operators, during the recent labor shortage, were faced with a problem of large scale hand unloading of grapes. Petri Wine Co. at Escalon, Calif., in conjunction with several truckers, began solving this problem by developing a new type of side dumping truck that eliminates manual labor and provides for a more uniform and increased flow of grapes to the crushers.

The first step in the production of wine is the crushing of grapes by means of passing them through a crusher that separates the berries from the stems and crushes the grapes. In large scale wine production grapes are received by the winery in tank truck gondolas. Until recently the grapes were fed to the crusher from these gondolas, by hand.

The trucks are made from standard grape gondolas, with one side constructed at a 30-deg. angle. (See Fig. 2). Additional reenforcing is added to strengthen the bottom and sides of the tanks as shown in Fig. 3. Specially built hinges fasten the tanks, at the dump side, to the truck platform.

It was found necessary to slow down the speed of the hoist cable. This was done by using a double pulley arrangement. The conveyor chain was also slowed down and a board damper built in the crusher box. In addition, to relieve the weight on the truck bed caused by the upward lift, supports were placed under the bed where the tank hinges onto it.

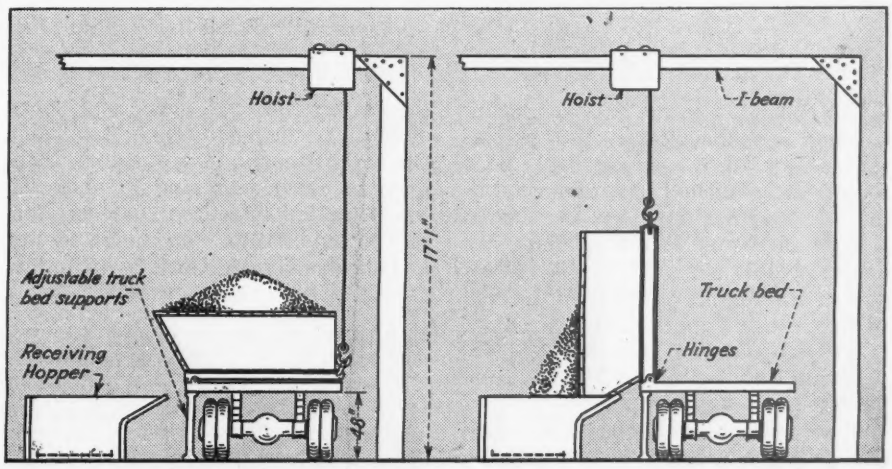


FIG. 1. The truck is driven close to the receiving hopper, adjustable supports are placed under the bed, and cables from an overhead electric hoist are fastened as described.

To unload, a truck is driven up beside the receiving hopper, cables from an overhead electric hoist are fastened to hooks on the frame and the free side of the tank is lifted. (See Fig. 1). Trucks are unloaded at a rate which keeps the crushers operating at capacity. A 10-ton truck can be unloaded into a 60-ton per hour crusher within 10 minutes.

Previously, 20 men were required to unload grapes at this winery. With these side dump trucks and three electric hoists, only two men are needed.

Acknowledgement is given to the following for their experimental work leading to the development of this unloading device: Messrs. L. N. Bianchini and J. Olivieri of Petri Wine Co., Mr. A. Scanavini, Central California Blow Pipe Co., Italian Vineyard Corp. and members of Wine Institute staff.

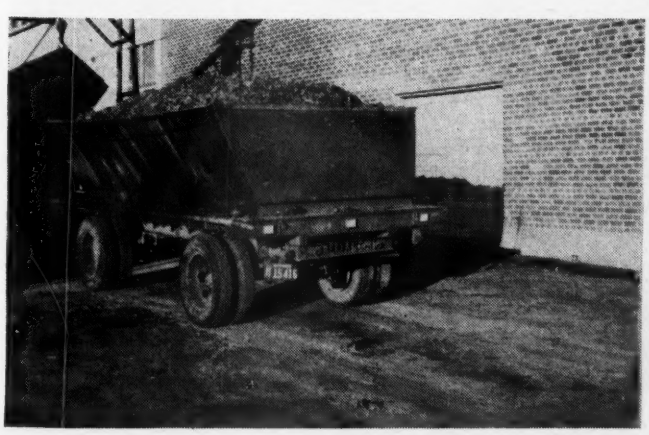


FIG. 2. Truck, showing "dump" or sloping side, converted at low cost and by simple construction from standard grape gondolas.

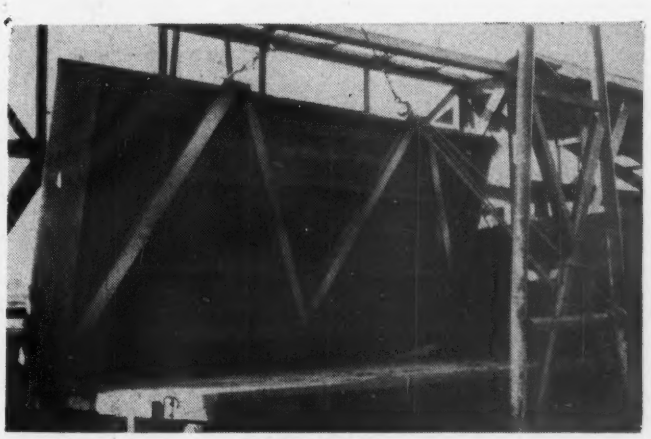


FIG. 3. Bottoms of tanks are fitted with special A-frames made of I-beams. Top and sides are reenforced with angle iron.

FOOD PLANT SANITATION Is Not Just a Chore

PART I—The food plant where sanitary practices are regarded as simple cleaning tasks is very likely missing the first step in achieving quality control of its products. This first of two installments discusses pest elimination and control.

By M. E. PARKER, Counselor in Food Production Development, Chicago

SANITARY control requires training and discipline. In application, it is a 24-hr. per day job, and a tough one. Without an understanding of its importance and a recognition of its benefits, the job becomes an impossible one. Quality is the result of intelligent effort plus the will to produce a superior final product.

A well-balanced sanitary control program can be divided into three parts:

Pest control or elimination, cleaning or housekeeping, and sanitizing (i.e., antisepsis).

Each of these aspects is of major importance and should not be overlooked or neglected.

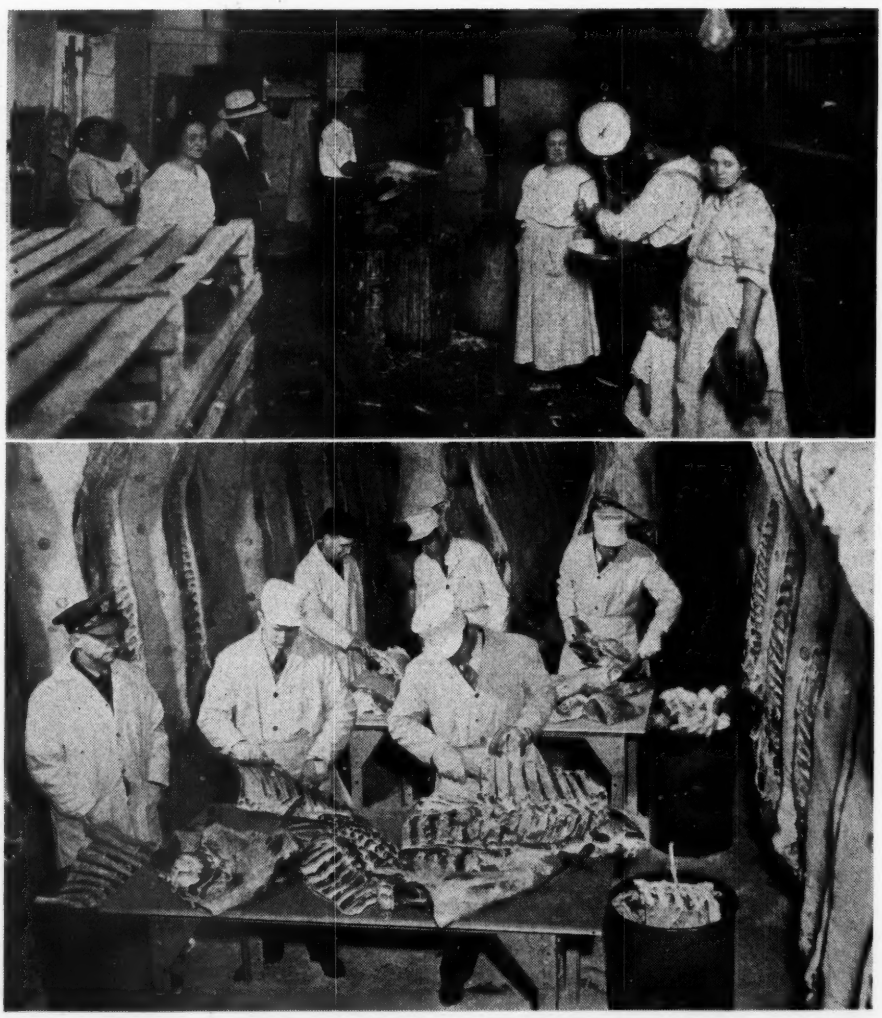
Pest Control

The problem of insect and vermin infestation is always disturbing and is an ever-present threat in every branch of the food industry. No type of food appears to be immune. The vigilance of the Federal and state food and drug administrations is well-known and justly deserved. The adage that a man must "eat a peck of dirt before he dies" is not in keeping with present day demands in the marketing and distribution of processed foods, nor in the interest of public health.

Steady Growth

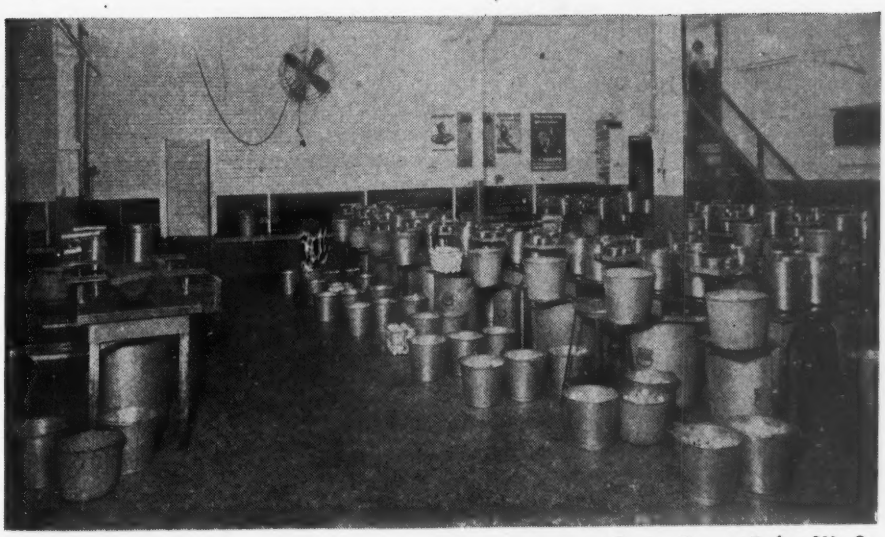
The interest in pest control has been of gradual progressive growth. The public health factor has resulted in many types of heat-treatment and processing of foods to make them bacteriologically safe. Today "ptomaine poisoning" is rare. As the processing of foods developed efficiency and qualitative effects were studied and improved, sanitation of the processing equipment came under increasing scrutiny. As market demand for processed foods increased and production soared, the products themselves became more and more difficult to inspect. Then, too, with the improvement in laboratory technics, in equipment, and in methods, the detection of macroscopic or visible contaminants was made easier and became more specific. Finally, the detection of extraneous material in processed foods by high magnification helped to point up the problem of pest control and elimination.

The importance of the insect, rodent and pest infestation phase of the food manufacturer's responsibil-



These two pictures illustrate almost too vividly the vast difference between good and bad housekeeping in the food processing plant. But simple cleanliness will not alone meet the sanitation requirements of the present day food plant, since inspection by high magnification will reveal the most minute evidence of extraneous and filth-laden material.

ity to the consuming public has been heightened by the decision of the U. S. Supreme Court[1] in the case of the *United States of America* vs. *Joseph H. Dotterweich*. The decision holds that an "officer of a corporation is subject to prosecution under the Food, Drugs and Cosmetic Act for the acts of the corporation in shipping misbranded or adulterated goods though he may not have been conscious of the fraud." That ruling practically forces food processors to make certain that no foods become adulterated during their manufacture. The presence of insect fragments, rodent hairs and excrement is a definite liability, just as is the accidental incorporation of poisons resulting from the use of toxic insecticides, or similar materials, identifiable only by chemical analysis.



Courtesy Creamery Package Mfg. Co.

This modern egg breaking room shows the metal utensils, tables and stools, as well as the hard surfaced, readily cleaned, cement floor that denies pests necessary food and harbor.

Vermin

Normally in cleaning and sanitizing, we are concerned primarily with microbiological and biochemical effects. In the control of insects and vermin we are concerned with macroscopic evidences of extraneous contamination that provide circumstantial and, unfortunately, eye-witness evidence of the most damning and damnable character. The foregoing decision is likely to have far-reaching implications, particularly now that the stress and strain of war no longer provides reasonable doubt or extenuating circumstances. A manager's admonition to an employee to "bear down on the broom a little harder, Tony," will prove much too inadequate. Sweeping and scrubbing are not enough.

Insect Sprays

There is an urgent need for a technology that will minimize and eradicate insect and vermin infestation. Of real importance are the correct concentrations of pyrethrum and rotenone in the spraying fluid for the various types of insects, an adequate air pressure, as well as the proper design of the spray gun to give lethal vaporization, and the frequency, methods and points of application—to mention some of the more important factors. A precaution worth mentioning is that steam cannot be successfully used for vaporizing an insecticide. Steam not only dilutes the potency of the spraying compound but it breaks down the rotenone and pyrethrum which are the paralyzing and killing agents. Another point of caution is that most sprays, a few years ago, were simply extracts of pyrethrum in kerosene and their quality could be relatively and readily determined by chemical analysis. Unless the composition of the sprays is specified, the food manufacturer may be obtaining a household insecticide containing one or two organic intensifiers, synthetic toxicants and similar ingredients whose value in the control of flies, roaches and other insects can only be determined by bioassay.

Safe Anywhere

One of the major advantages in the use of rotenone and pyrethrum compounds is that they can be used in any food plant with safety, will not taint food, and are effective on all types of insects normally found in food plants. Such compounds, however, do not destroy insect eggs. For that reason, the spraying should be done at intervals of at least every two weeks during the breeding seasons. In the control of the common housefly, daily applications may be found desirable. Sodium fluoride is an effective insecticide, but unfortunately it is highly toxic and its use around foods is to be avoided because of its possible poisoning effects. The previously mentioned Supreme Court decision emphasizes the desirability of avoiding the use of such toxic products.

War Developments

Availability of many of the wartime insecticides and repellents for peacetime use is not only possible, but quite probable. Special fractions of rotenone, now available for use in compounding insecticides, are truly remarkable in the retention of their repelling properties. They are used by spraying with low air pressure (using the conventional, manually operated spray gun, for example) or they can be applied with a paint brush on surfaces where insects harbor. These insecticides are especially effective in the painting of screens which will keep away flies or, if the flies do come in contact with the screens, they die within five to ten minutes. These insecticides retain their repelling and killing properties for a considerable length of time as long as the painted surface is not covered with grease, dust or dirt. Accordingly, such products have utility for motors, switch boxes, conduits, intake doors, refuse pails, as well as screens. These products have, however, the disadvantage of tainting food. They impart a very disagreeable flavor, which is also true of most conventional household sprays.

Not Always Lethal

Spraying with extracts of rotenone and pyrethrum is not entirely satisfactory as the lethal effects are often more apparent than real. It is important, therefore, that the proper concentrations of these lethal agents be used. Use of greater concentrations for some types of insects has been found necessary. Phosphorous paste, for example, will kill insects, such as roaches, in a few hours after they eat it, but although it attracts the American cockroach, the German variety leaves it untouched. A so-called "drinking fountain" method, consisting of a vial of an insect poison (harmless to man) in aqueous solution, which the insect drinks and ingests, is attracting consider-

[1]U. S. Supreme Court Reports, Law Edition, Vol. 88, p. 74 (1944).

able attention. This residual technic of control has been most effective in a variety of applications.

Pyrethrum α Mixture

In the case of pyrethrum, recent data obtained in studies on the constituents of pyrethrum flowers, indicate that pyrethrolone is not a homogeneous compound as previously assumed, but a mixture of components differing in their chemical structures and properties. These components can be partially separated by distillation and show marked differences in refractive indices. In the light of these data, the apparent discrepancies between absorption rates and chemical facts can be explained.

Use of DDT

An insecticide that made history in wartime uses and applications is known as DDT. Prior to the use of DDT, the Army was using a pyrethrum MYL as a delousing agent. After some preliminary tests on prisoners infested with lice, DDT was used to check the typhus epidemic in Naples. It has a chemical formula based on dichloro-diphenyl-trichloroethane.

While DDT has had a romantic history and has incidentally received wide publicity, there is every reason for food processors to be extremely cautious in its use in food plants. Knowledge of its toxicology is growing daily, as are the accounts of serious poisoning of persons using it indiscriminately. In fact, its use in food plants is highly questionable. Leading national insurance companies refuse to provide food product liability coverage to insecticide manufacturers using DDT in their formulas. An attitude of caution has recently been adopted by the Federal Food and Drug Administration for the information of food processors. In addition, there is growing evidence that its effectiveness upon certain insects common to food plants is questionable or nil. For these reasons food manufacturers should delay the use of DDT, in those operations where contamination of the food products might result, until more is known about it and its toxicology.

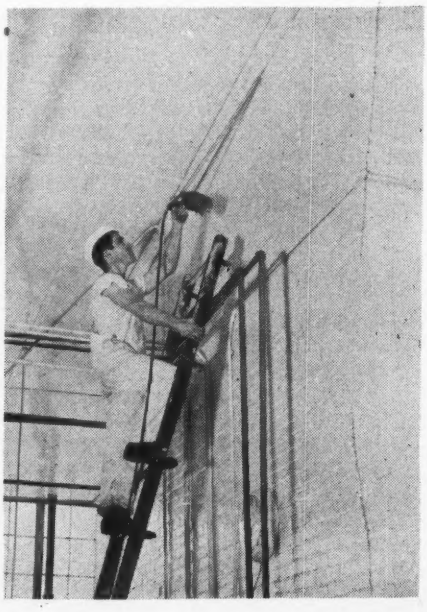
Food Plants Insects

Flies, beetles, mites and cockroaches are the most common insect pests found in food processing plants. The common housefly is well-known and thoroughly incriminated as a filth carrier, a disease carrier and an all-around nuisance. Dermestid and confused flour beetles infest flour bins and their fragments can prove troublesome. Mites are barely discernible to the naked eye, but the results of an infestation can be readily seen. With cheese, for example, the surface becomes covered with a brown dust that has a characteristic musty, sharp odor. Mites have the ability to go into a state of what might be called hibernation and in this state can survive for several months without food, only to become active again when food is available.

The Cockroach

One of the filthiest of all insects is the cockroach, which secretes a foul liquid from its scent glands, an obnoxious saliva from its mouth and leaves its droppings wherever it travels. It can and does get into almost every spot in a food plant. It can and does inevitably end up in food products, where it is detected and tagged as "insect fragments or insect parts," particularly when the infected food product can be subjected to a test for extraneous material. Three common varieties of roach normally infest food plants. They are:

1. American roach, which is the largest variety and is found in storerooms, cellars and warehouses, as well as in boxes, cartons and shipping cases. Will average 1½ in. in length.
2. German roach, which is a small roach rarely growing to more than ⅝ in. long. It infests kitchens or similar places where food is prepared.



Courtesy Kraft Foods Co.

A vaporized insecticide is here being forced into crevices of false ceiling with air pressure. For best results the air pressure should not fall below 40 lb. per sq. in. The higher the pressure the better the atomization.

3. Oriental roach, which is also known as a "water bug" because it swims naturally. It is dark brown to black in color and, when full grown, measures about an inch long.

Long Lived

The average life span of a cockroach is about 21 months with a probable minimum of one year and a maximum of 3½ years. Females produce an average of four egg sacks from which the offspring hatch. Incubation period averages a month, although the eggs may lie dormant for long periods of time. The roach breathes through vents between shell plates on its abdomen. Poisons such as pyrethrum and sodium fluoride are picked up by the roach through these vents as well as through the mouth. DDT does not appear at the present time to be particularly effective upon roaches.

Fumigation

Fumigation is a most effective means of insect and vermin eradication. This method is applied when the infestation is too extensive to be brought under control by the more conventional and safe practices using sprays and powders. Methyl bromide is perhaps the most practical fumigant. Where a constant menace of heavy infestation exists, as in old wooden structures, fumigation at least once or twice a year will be found profitable. In new plants, and often in the reconstruction of food processing factories, consideration of engineering and architectural aspects of insect and rodent control is possible. Even proper correction of existing buildings pays dividends and in many instances the incidental expense is surprisingly modest. Where such structural corrections seem inadvisable, however, fumigation is the recommended alternative. Then, too, there are some forms of insect life, aside from the eggs or larva, such as mites, that are resistant to atomized fogs of pyrethrum and rotenone insecticides and that only fumigants such as methyl bromide will kill. Fumigation, to be effective, however, must be applied in a building that can be sealed until it is sufficiently gas-tight to hold a lethal concentration. Most fumigants used, including the cyanides, are just as lethal for man as they are for insects and vermin. This is true of methyl bromide and it should be used and applied only by an experienced operator. His instructions must be carefully followed to avoid danger both to plant operatives and products alike.

Rodents

While insect infestation is something every food manufacturer abhors, there is nothing as repulsive, nor as expensive, as rodent infestation and pilfering. Rats and mice spread fleas, hair and filth on everything with which they come in contact. Whenever they infest a food plant, it is practically certain that hair or droppings will be found in the finished food product. The spread of disease by such contaminants is an ever present threat. The Food and Drug Administration has many indictments against food processing plants for the presence of rat hairs and waste in their products or merely for the evidence of an abundant rodent infestation inside the plant premises. This close policing by governmental agencies will become even more stringent in the future.

Three Kinds

The overall city rat infestation throughout the country is caused by three common species. These are the roof rat, the black or Alexandria rat and the brown or Norway rat. The Norway rat is by far the most predominant and hardy of the several species. The distinguishing characteristic of the Norway rat is his blunt nose, small ears, feverish evil eyes and a coat of grimy brown. Because of his size and ferocity he usually takes over any territory he wants, running out the roof and black rats. They not only can dominate the other two species but also house or alley cats. For this reason, cats are a poor control for full-grown rats. The average length of a grown brown rat is 17 in., including tail, and his average weight is ¾ lb. A pair reproduces from 3 to 12 times annually with an average litter of nine.

Mice in food plants are usually of the species classed as the house mouse. In comparison with their size to that of the rat, they cause relatively as much damage, although they are not as great a health hazard.

Four simple rules should be followed to control rats and mice: (1) Do not feed them, (2) do not shelter them, (3) deny them entry into occupied buildings, and (4) destroy them.

Feeding rats and mice is simply a measure of poor housekeeping and sanitary control within a plant. Sheltering them usually involves a poor method of storage. Denying them entry into a plant is simple rodent-proofing. Destroying them means either trapping, poisoning or gassing them. Poisoning is the best recommendation for safe control within food plants. Some of the potent killing agents are:

- Red squill
  - Commercial powder
  - Fortified powder
  - Liquid extracts
  - Barium carbonate
- Arsenic compounds
  - White arsenic
  - Liquid arsenic preparations
- Phosphorous
  - Pastes
  - Solutions
- Zinc phosphide
  - Powder
  - Paste
- Strychnine
  - Alkaloid
  - Sulphate
- Thallium sulphate
  - Powder
  - Solutions
- ANTU (Alpha naphthyl-thiourea)
- 1080 (Sodium Fluoro-acetate)

Experienced rodent control experts are familiar with all of these agents, with the possible exception of the last two. "ANTU" is the poison developed by Dr. Curt P. Richter, at Johns Hopkins University, while "1080" is the material discovered by workers in the Wildlife Research Laboratory of the Fish and Wildlife Service.

In this list, however, red squill is the only one that can meet the "non-toxicity" F&DA specifications, that only agents non-toxic to humans or pets and noncontaminating to foodstuffs may be used in food processing plants. The new killers, ANTU and 1080, although more toxic to some species of rats than red squill, are definitely forbidden inside food plants. They hold much the same position as do sodium fluoride and DDT in insecticides.

Attractive Bait

The secret of killing rats and mice, however, does not lie in the killing agent of the bait. The rat must first eat the bait. To achieve this, the bait must be, of course, attractive to the rodent. Enough red squill, if properly fortified, can always be included in a bait to kill rats, but the problem lies in making the bait palatable and attractive enough to get the rodents to eat it.

One ounce of the powder mixed with 10 oz. of ground meat or fish is an effective proportion to use. The placing of small balls of this bait in runways and hiding places is helpful, although some rats are extremely cautious of human scent. The regular source of food supply of the rats must be eliminated to make them aware of the bait. In addition, the plant must be rat-proofed, which means plugging up the inlet and outlet holes of the rodents.

Here are three arch enemies of the food plant operator. At the top, is the Norway rat, while in the middle, we see his smaller cousin, the roof rat. No relative, but a good friend is the fellow at the bottom, whose head was blown up for the picture. Normally he is just a plain cockroach.

A recently developed rodent bait, containing red squill, has been given wide recommendation because of its strong attraction for rats. Since rats and mice enjoy approximately the same diet as does man and, living in the dark as they do, they urgently desire foods, including vitamins that are not easily attainable. This bait fills that desire and exerts a strong biological attraction for rats that makes resistance impossible. Moreover, it lessens the appetite for other foods. It includes vitamin E as wheat germ oil and a series of other stimu-

lating foods such as fish and vegetable oils plus cheese and dehydrated meats. This bait possesses not only the desired safety properties but has the virtue of forcing the dying rat to leave the premises because of its suffocating property. This formula was developed after several years of laboratory experiments on rat foods.

Responsibility

Once a plant has been freed of pest infestation, it can be kept free by effective control measures with safe insecticides and rodenticides. It is very important, however, that all outside breeding places be brought under control and not neglected. And it is equally important that some individual, properly trained in the application of effective control measures, be held responsible for maintaining such control.

Until a trained individual can be obtained, a professional pest control organization or eradicator can be used to advantage. But such professional services should not be considered to be a full solution to the pest control problem. In many instances the services of a professional eradicator will be found inadequate because, in many food plants, fresh infestations of insects and rodents are common. The incidence of these infestations make the usual monthly periodic applications ineffective. Then, too, with the professional eradicator, there is the danger of his using products not suitable for use in plants where foods are being processed. Since the responsibility for pest control funnels back to the plant management, management's interest is to make certain that its pest control program is both safe and effective.

In its work, this trained personnel should have the help and cooperation of the food company research department. The research department should be charged with checking the effectiveness and the safety of the pest control products to be used. This checking will serve the useful purpose of assuring that the products used are of proper composition and that they comply with F&DA specification standards. These phases of a systematic sanitary control program cannot profitably be neglected. The future development of the food processing industry demands adoption of systematic sanitary control programs. Without them, the food processing industry cannot hold consumer confidence and its product cannot obtain the desired increasing market reception.

How Electronic Grille Serves Hot Sandwiches

Hot dogs, hamburgers or cheese sandwiches are grilled and served electronically. Simply drop a coin in slot of vending machine quickly and automatically piping hot foods are served

THE machine looks something like the usual soft drink or cigaret vending machine, only slightly larger. It plugs into the regular 110-volt outlet, has a decorative front door with appropriate mirror, push button selectors for your choice of food, a glass window behind which is the electronic unit and a coil so that the customer can see his food getting the heat—by radio; and below this a glass door and compartment into which the hot dog or sandwich drops, ready for the customer.

Inside the machine are individual trays on which are placed the frankfurters, cheese sandwiches and hamburgers, wrapped in buns and inclosed in sanitary containers. The frankfurters and hamburgers have been cooked previously in a special sanitary kitchen, and all items inserted in the containers, untouched by human hands.

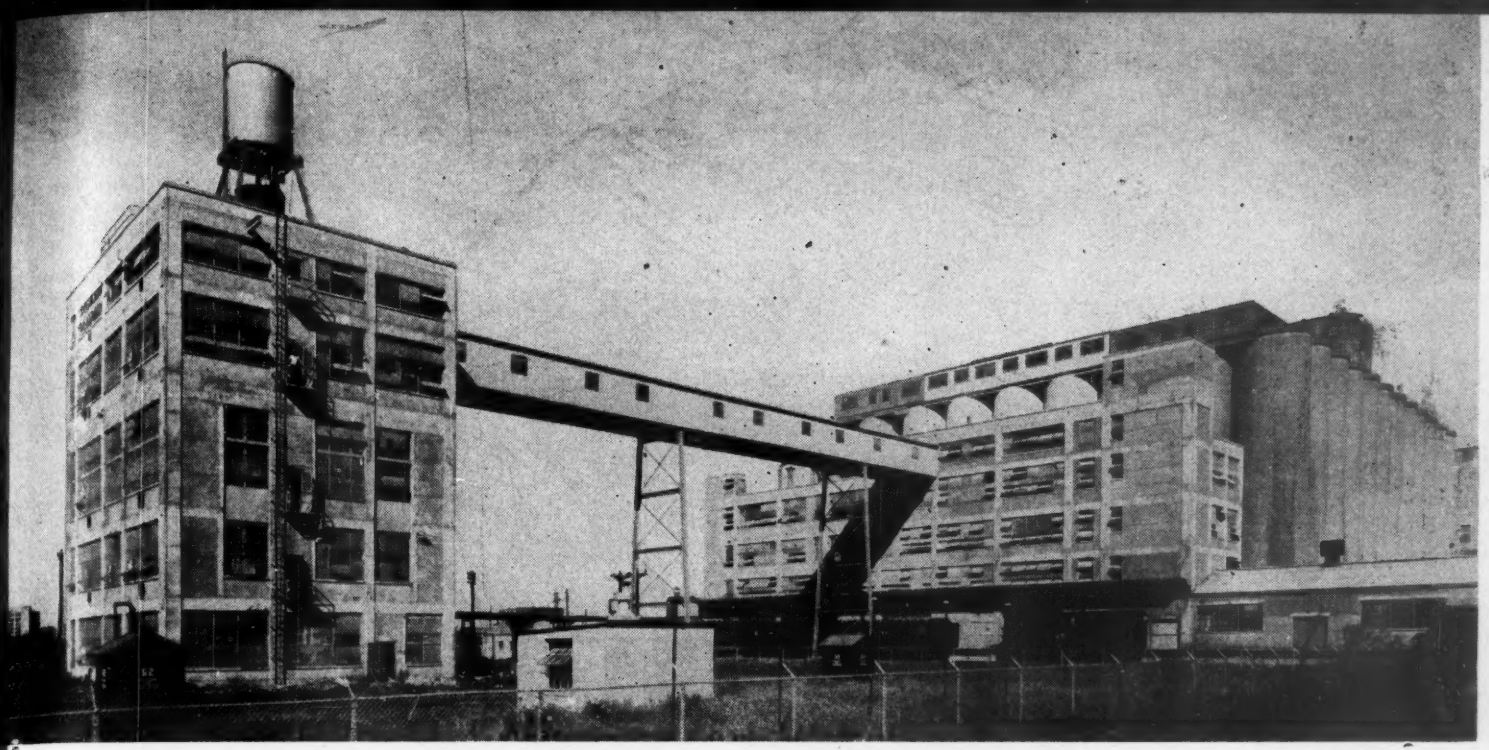
Anyone can drop a dime in the machine and push the selection button. This trips one of the trays and down into the electronic oscillator coil, visible to the customer, falls one of the wrapped sandwiches. As it falls into place, high frequency radio waves are brought into play, heating the item to proper temperature, whereupon it falls into the glass door compartment, ready to unwrap and eat. In the case of the hot dog, even the mustard has been applied previously, in the sanitary kitchen, of course.

The oscillator used to heat the canteen items is operated by two specially developed high-frequency power oscillator tubes, designed and made by the General Electric tube division. Over a thousand different types of oscillators were built before the problem of heating rolls and meat uniformly, without burning, was overcome. Some frequencies would heat the roll but not the frankfurter. Other frequencies would heat the frankfurter but burn the roll. Then, when it looked as though both bun and meat would heat uniformly, one end of the bun would burn. Finally, the right frequency was found, tubes and a special coil developed which would deliver the right amount of heat uniformly over the packaged item. To cut down radiated heat the oscillator unit is cooled by a blower. Polystyrene, a special plastic used in radar and other high-frequency work, is used in the oscillator unit to cut down loss of the electronic energy.

Engineers of the General Electric Company have collaborated with the Automatic Canteen Company of America in the development of this electronic canteen machine that will serve hot dogs, hamburgers or grilled cheese sandwiches at the drop of a dime and the push of a button.

It should *not* be construed from this development that the electronic stove is just around the corner. This is not the case. The canteen grill and the electronic stove present two different kinds of problems and the accomplishments in the development of the former should not be interpreted as solving the problems yet to be overcome in the field of electronic cooking.

A hot dog grilled by radio waves.



Soybeans are prepared for extraction in building at right near the storage elevator, and are conveyed over the high bridge to the building at left, where the oil is extracted and freed from solvent. The extracted and deodorized flakes are returned across the high bridge to the preparation building. Here they are toasted and milled for granule size and bagged for shipment. Floor space of the two buildings is over 60,000 ft.

SOYBEAN PROCESSING

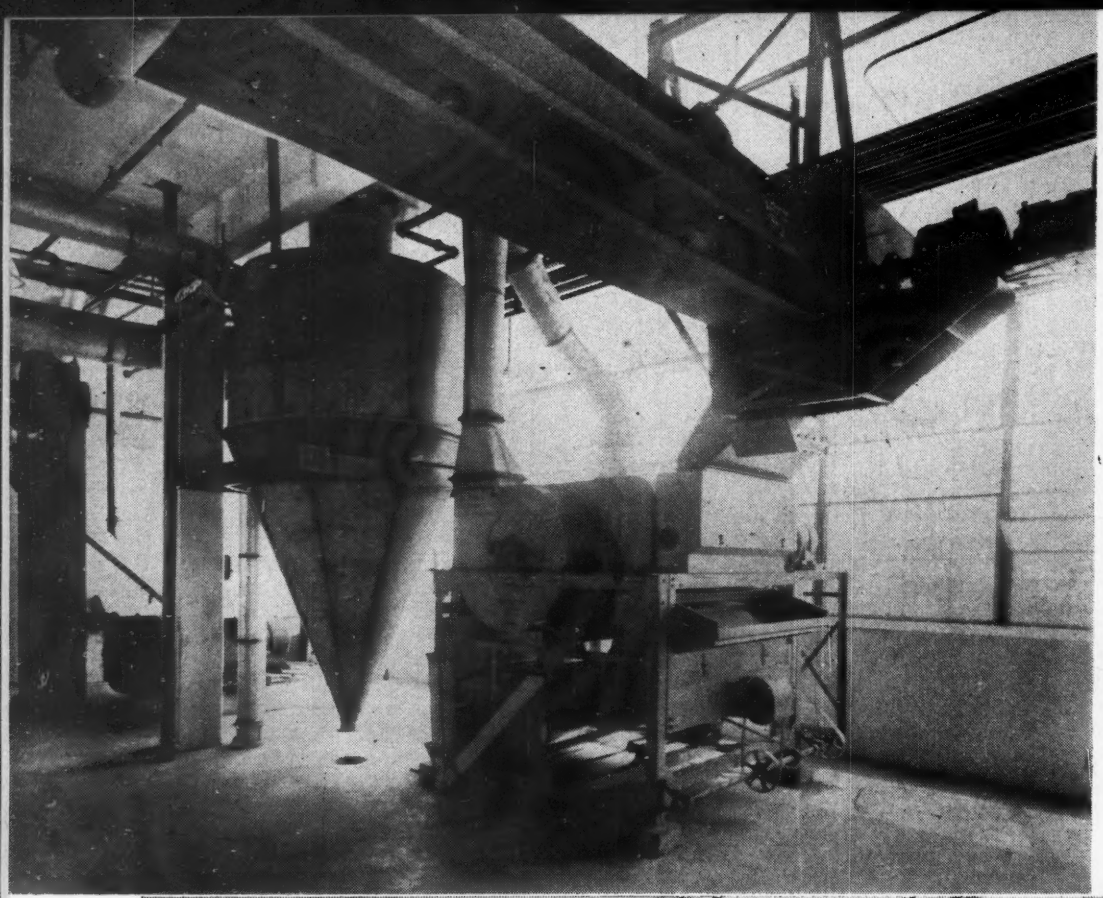
A. E. Staley Manufacturing Company's new $2,000,000 soya oil extraction plant at Decatur, Ill., using hexane as solvent, leaves less than one percent of oil in soya meal, as compared with about four percent left by mechanical pressing method. The meal has 44-percent protein content, three percent more than when oil is expressed mechanically.

The plant consists of two principal buildings, contains more than 60,000 sq. ft. of floor space, is adjacent to a 5,500,000-bu. storage elevator, and occupies a 45-acre tract including a 20-acre pond for plant—cooling water and auxiliary fire protection.

Explosion and spark-proof electrical equipment is used throughout the plant. A special ventilating system provides rapid removal of hexane vapors. The sprinkling system is supplemented by fog or "deluge" nozzles above, below and on all sides of equipment units. Each equipment unit is grounded and copper mesh is laid in floors to prevent buildup of static. Spring-wound clocks are used. All electrical controls are in an outside control house.

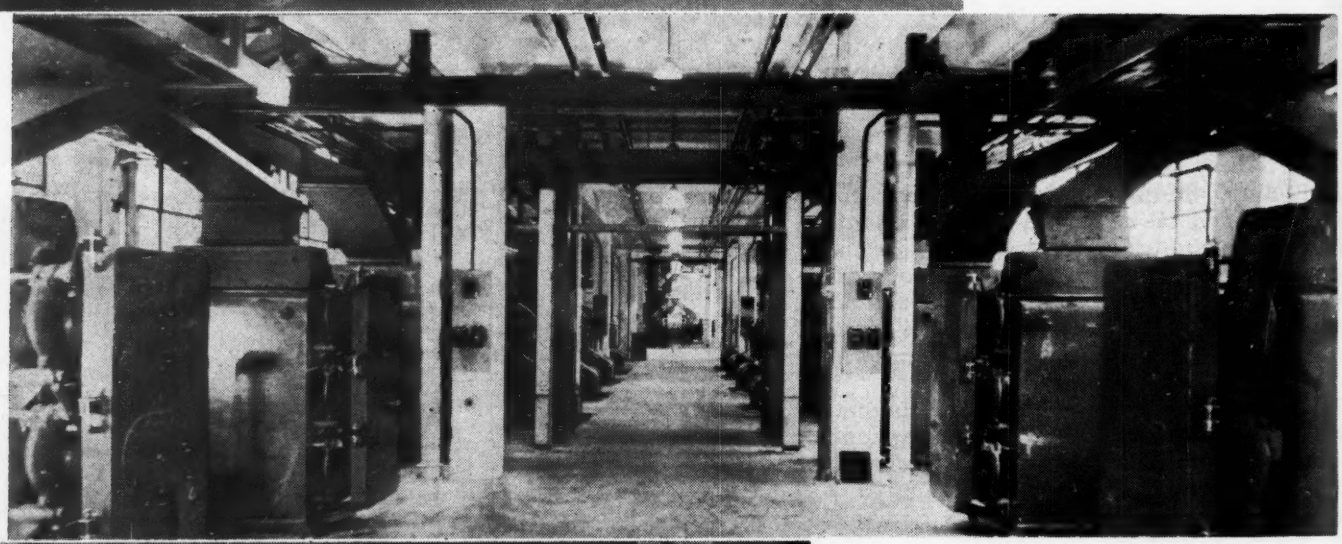
Processing of soybeans was begun in Decatur by Staley Manufacturing Company in 1922, using the mechanical expression method of obtaining the oil. A second mechanical expression plant was put into operation at Painesville, Ohio, in 1939.

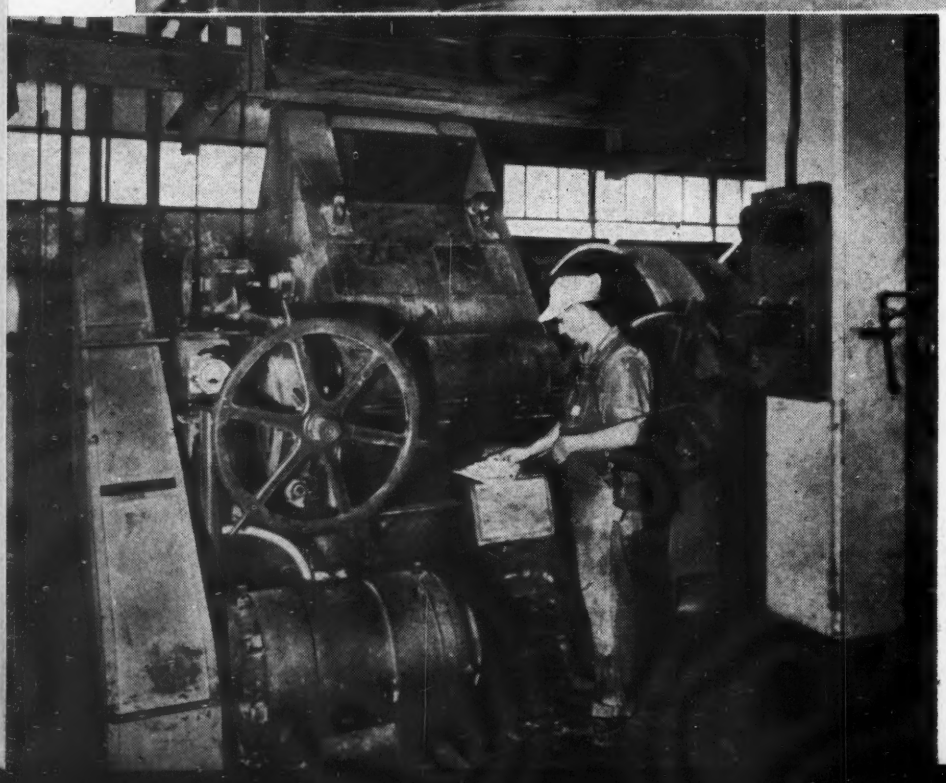
A power shovel of scraper-style is used to unload the soybeans from box cars. The beans fall through a grate into a pit, connected by a chute with a belt conveyor, for delivery to an elevator pit from which they are elevated to receiving scales preliminary to delivery to storage bins.



3. Overhead rubber-coated canvas belts, 18 in. wide, transfer the soybeans from storage bins to cleaner for removal of sticks, pods, corn, and weed seeds, by screening, and loose hulls by aspiration.

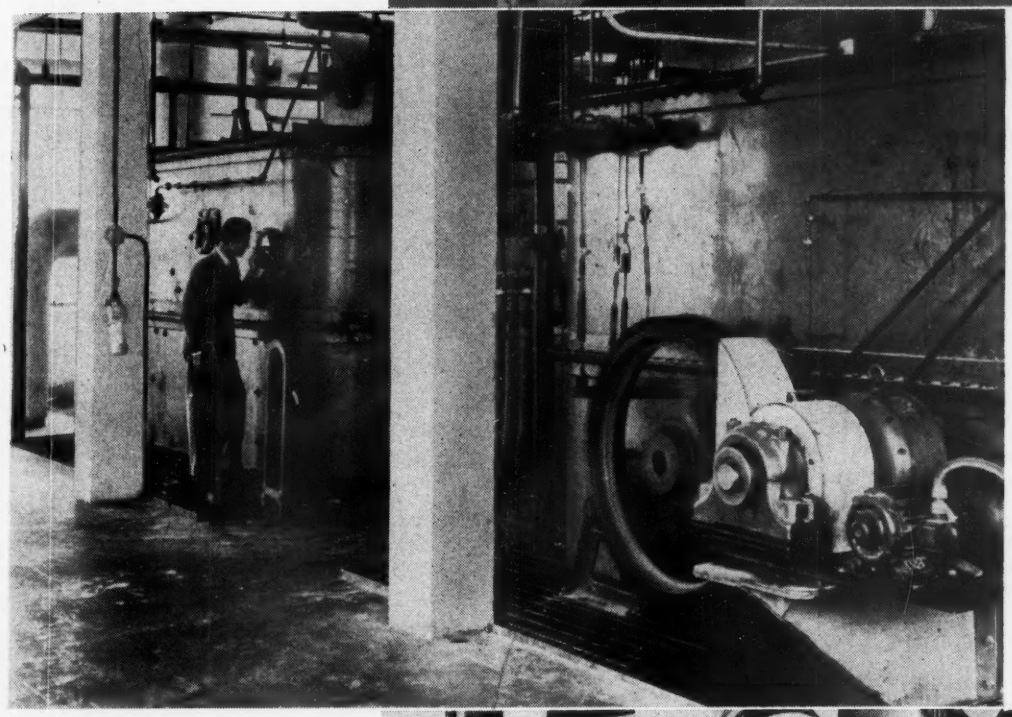
4. Below: After cleaning, the beans are cracked in vertical 3-roll mills to pass through a 10-mesh screen. Each mill is driven by a 30-hp., 1,200-rpm., fully inclosed squirrel-cage type motor. The cracked beans are conditioned for temperature and moisture content preparatory to flaking.



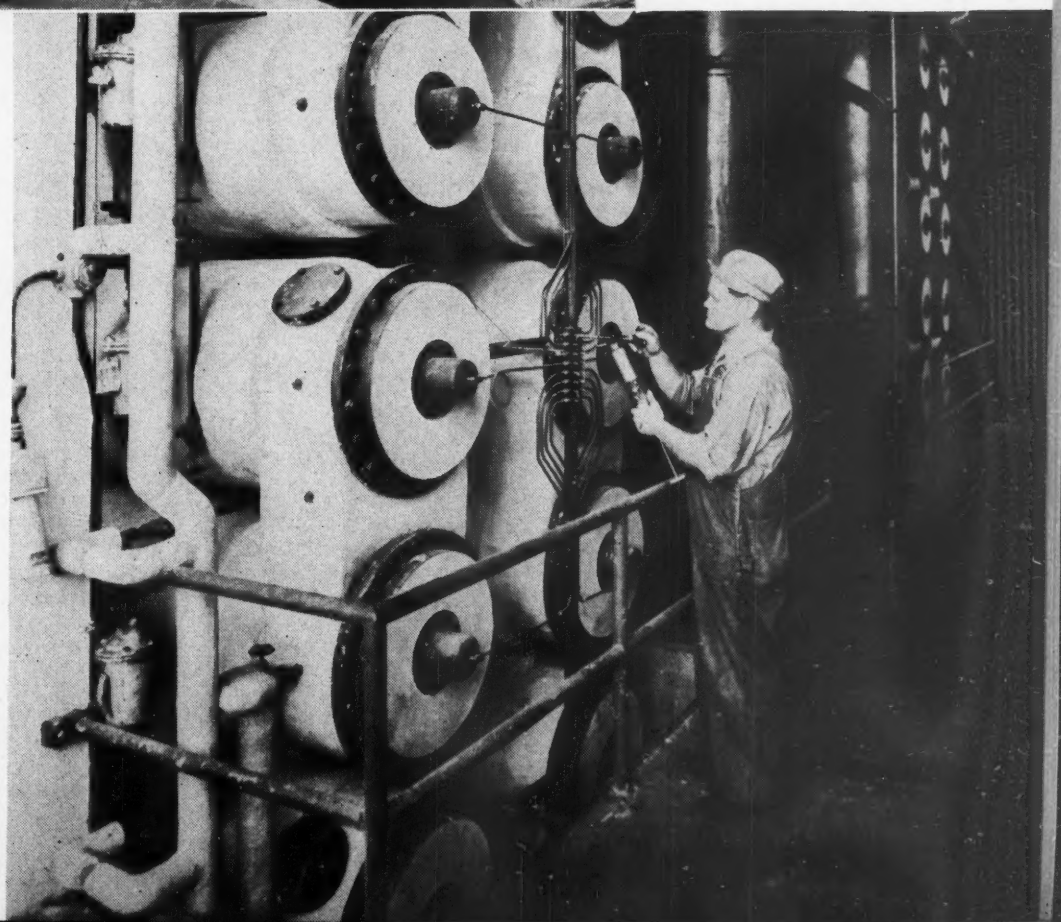


5. Preliminary to extraction, the cracked beans are flaked to have almost the same appearance as breakfast cereals. The flaking mills consist of two pairs of manually adjusted rolls fed by a hopper chute from the cracking rolls and driven by a 40-hp., 1,800-rpm., fully inclosed squirrel-cage type motor.

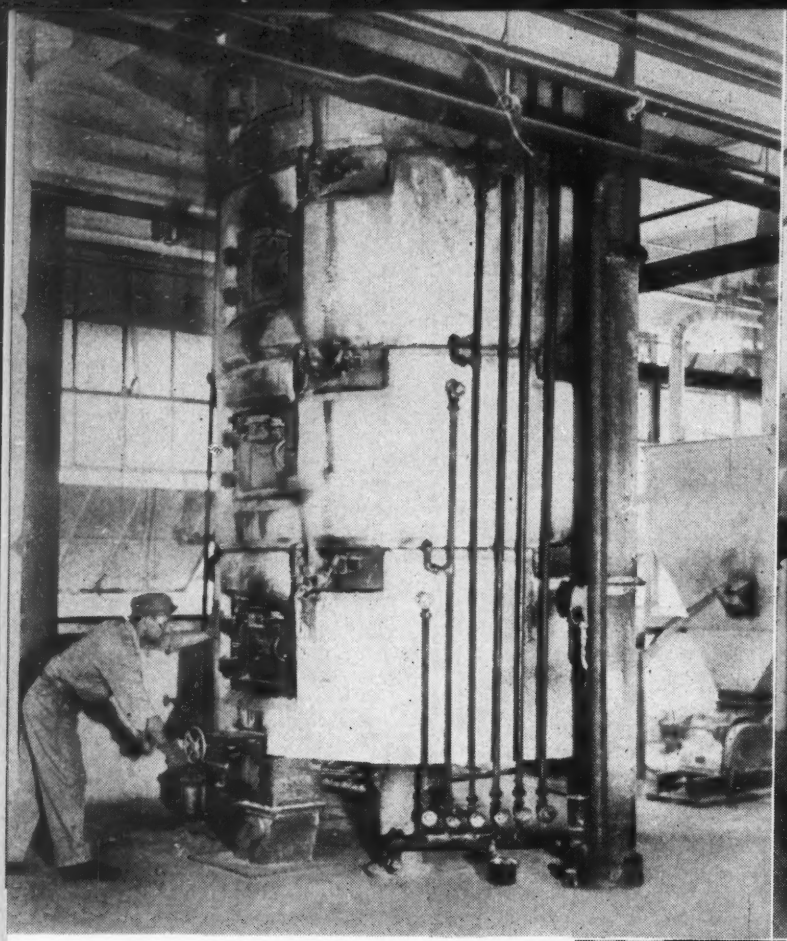
6. Continuous-flow type conveyors, driven by 15-hp., squirrel-cage type motors, transfer the flaked beans from the preparation building across the high bridge to the extraction building. A duplicate conveyor returns the extracted flakes to be toasted, ground and bagged.

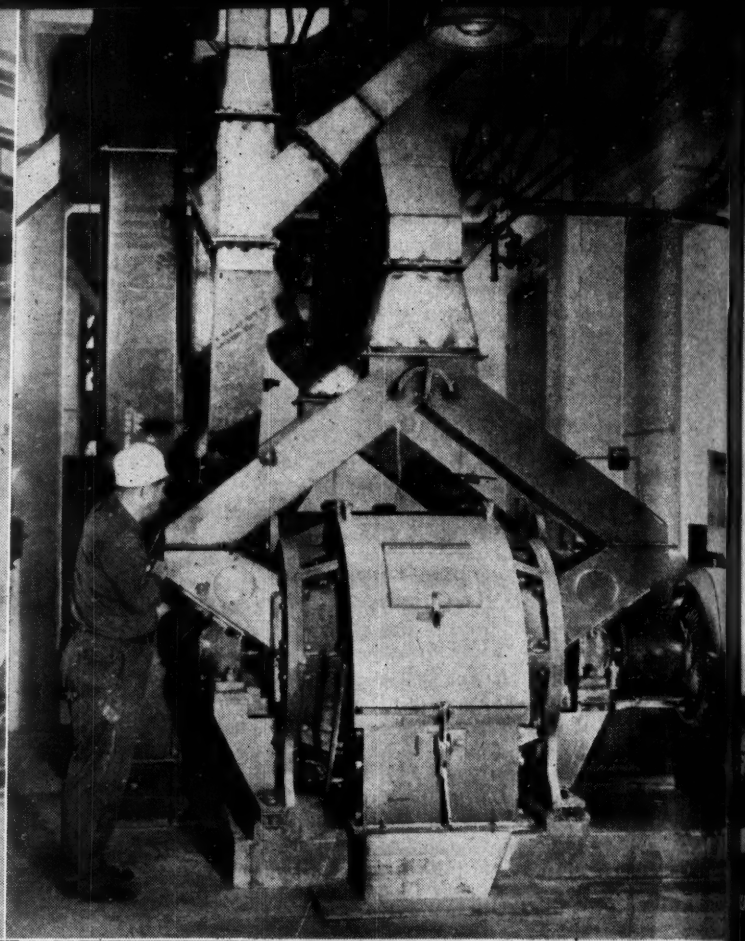


7. Extractors consist of vapor-tight towers, equipped with black iron baskets or buckets having perforated bottoms. These baskets or buckets are filled direct from the flaked-bean delivery conveyor from the preparation building. The filled baskets are sprayed with hexane through pressure nozzles and the oil is extracted as the hexane percolates down through the contents of the baskets.



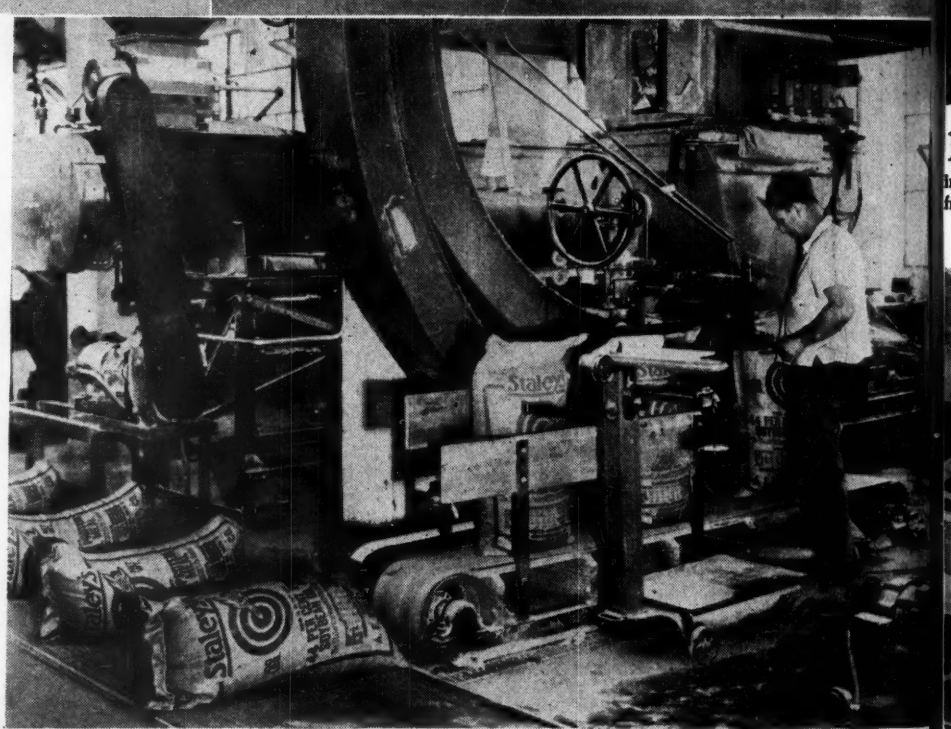
8. Residual hexane is evaporated from the extracted flakes during continuous passage through a series of steam-jacketed, steel, cylindrical-paddle conveyors. As the flakes are discharged by gravity from the continuous evaporator they drop through a closed chute into the deodorizer for removal of the last traces of the hexane. A special ventilating system removes hexane vapors.

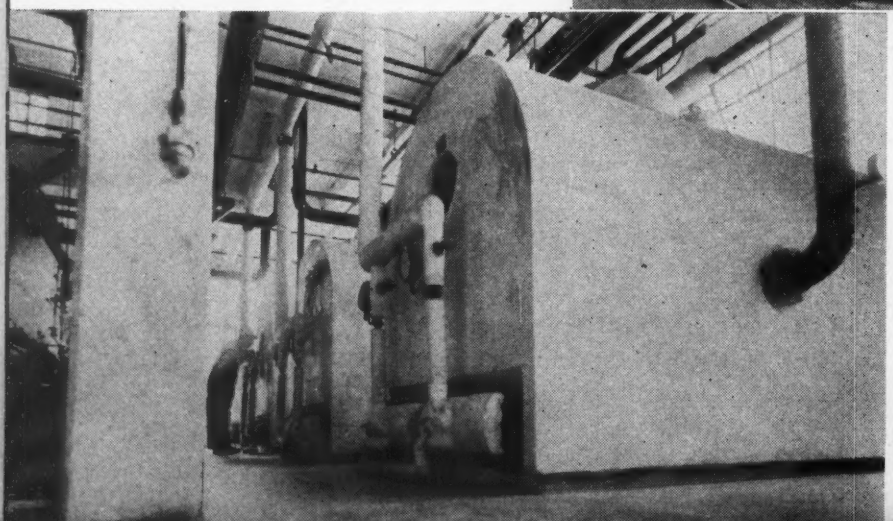




9. Above left: After being deodorized, the flakes are heat-treated or toasted to render the soya meal more palatable to livestock and to make the protein content more digestible. Charging of the steam-heated toasters is controlled by any convenient mechanical means such as feeders or slides.

10. Above right: As the flakes are discharged from the toasters through closed spouts they are cooled by passage through stream of cold outside air en route to hammer mill. The mill is driven by 100-hp., fully inclosed squirrel-cage type of motor. The meal is milled to pass through a 16-mesh screen preparatory to being shipped in bulk or packed in bags for use in livestock and poultry feeding.





11. Above: Ground meal to be bagged is conveyed by continuous-flow elevators to electrically operated packing scales. It is packed 100 lb. per bag with the aid of an electrical vibrator. Standard platform scales are used for check weighing. A floor-level, endless-belt conveyor delivers the sewed bags to the shipping department.

12. Left: Hexane solvent is distilled from the crude soy oil in a steam-heated, two-stage evaporator preliminary to transfer of the oil to the refinery.

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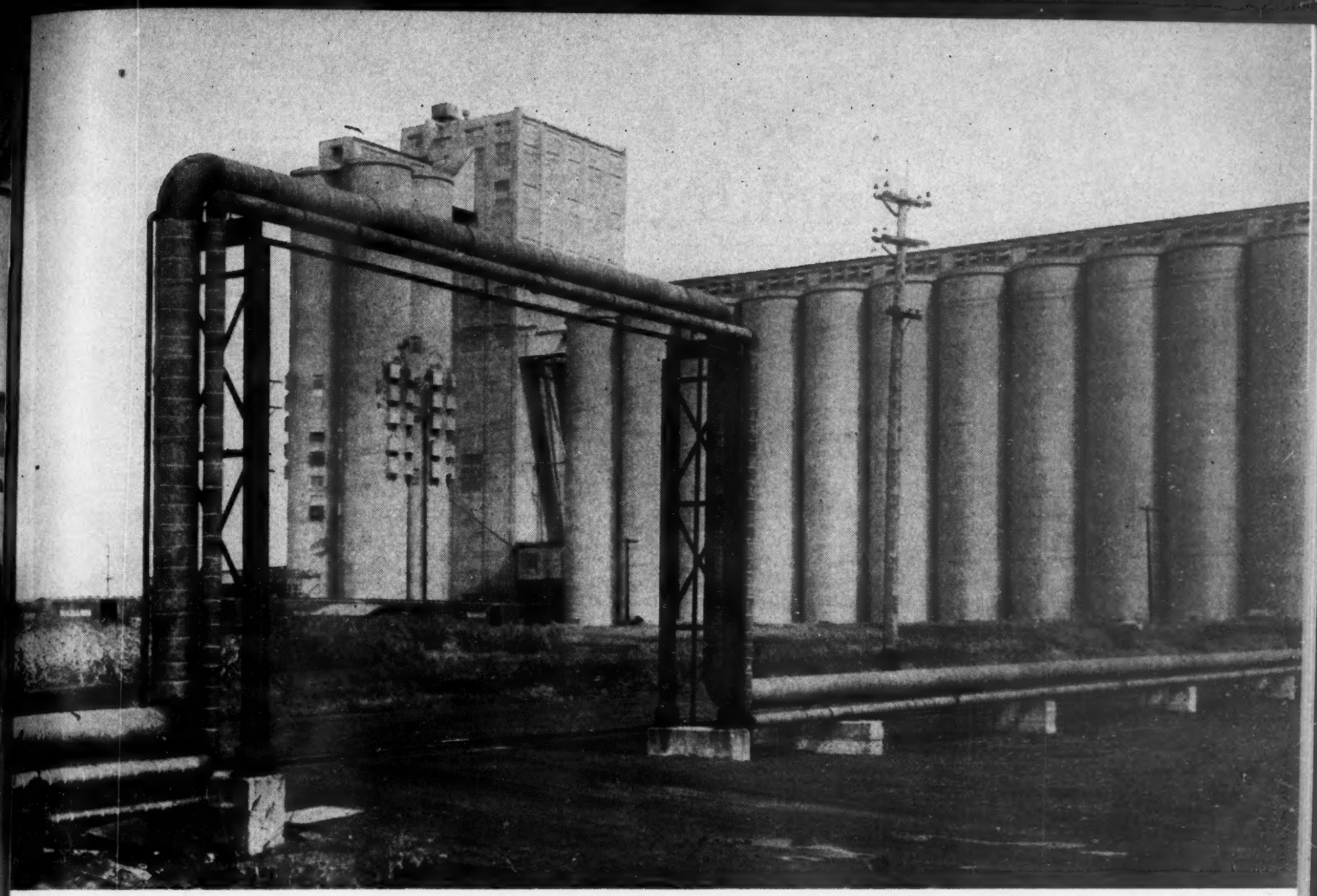
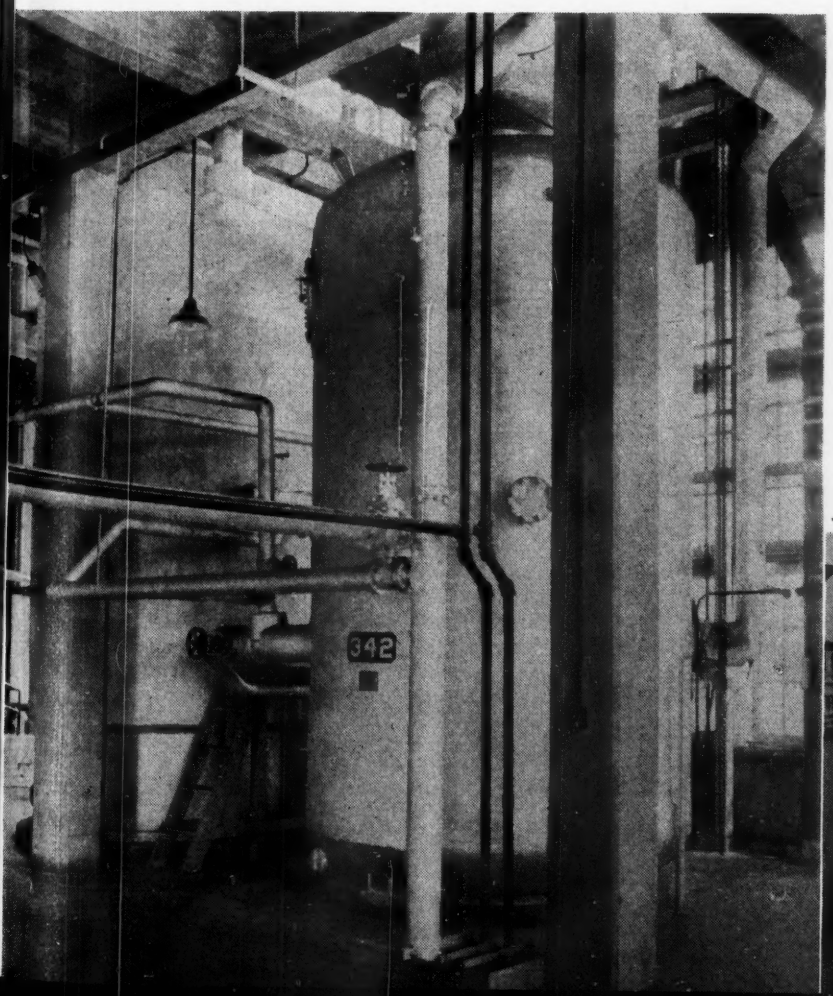
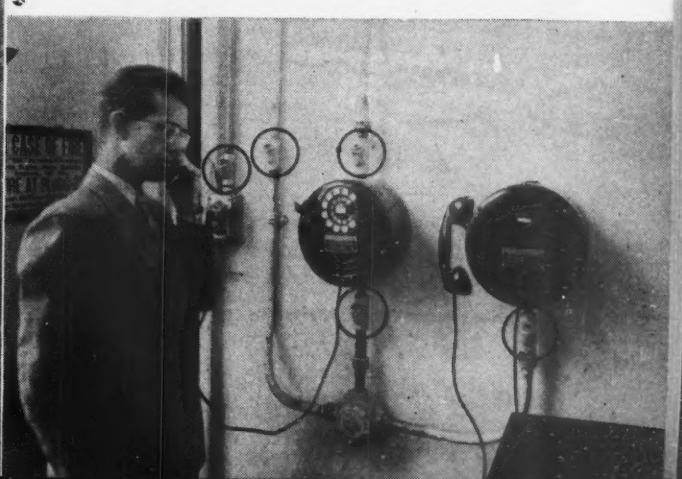


13. Above: Crude soya oil is pumped through a 2-in. pipe to the refinery about a mile away. The oil-line parallels a 10-in. heavily insulated steam-line and an insulated 4-in. condensate return line running from the boiler house to the refinery. In this way transfer of crude oil by tank cars is made unnecessary, thereby eliminating extra handling of the oil and a possible tie-up of refinery operations because of an intermittent supply of oil. The arch over the roadway allows ample clearance and provides expansion and contraction curves for the two pipe lines.



14. Left: After the crude soya oil has been refined by methods generally used for vegetable oils, it is deodorized by the action of steam blown through the oil in a unit operating under a vacuum. The oil is now ready for shipment in tank cars or drums for use as a food constituent or ingredient.

15. Below: Precautions against explosion hazards are carried out to the extent of having the extraction-plant telephones inclosed in hexane-vapor-proof cast iron boxes. Phone at left is connected with the plant switchboard for outside calls. Phone at right is on an intraplant line. Plant personnel can be called by signals sounded by the buzzer shown at the left of the user of the outside line phone. Explosion-proof condulets (circled) are used when a conduit ends in an enclosure in which arcing or sparking is likely.



Trichinae Killed By 120-deg. F. Dehydration*

Tests of the effect of dehydration on the viability of trichinae in pork show that the parasite survives lower temperatures but is killed by dehydrating at 120 deg. F. or above

By L. A. SPINDLER, C. F. DUNKER**, and O. G. HANKINS,
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U. S. Department of Agriculture, Washington, D. C.

IT IS a well-established fact that salting, combined with drying, is an effective method of destroying trichina larvae in pork and pork products[1,2]. From a practical standpoint, there has seemed to be little need for information on the effectiveness of drying alone in destroying this parasite. Recent investigations in the department have shown, however, that it is possible to produce a pork product of high quality in some respects by dehydrating the raw meat at relatively low temperatures by the freezing-cabinet process[3]. Since in those investigations dehydration was accomplished not only at a low temperature but without addition of salt to the meat, there arose a question as to the effectiveness of the process in destroying the viability of trichinae. Consequently, research was carried out to ascertain whether or not the viability of trichinae in fresh, unsalted pork can be destroyed by rapid dehydration when the temperatures employed are lower than the thermal death point of the parasite (131 deg. F.).

Experimental Procedure

Eight experiments were carried out, utilizing in each the flesh of a hog harboring a heavy experimental infection of trichinae. Following slaughter of the animal the skin and subcutaneous fat were removed and the carcass chilled four to five hours at a temperature of approximately 35 deg. F. The meat was then boned and cut into strips approximately one inch thick. The strips were then spread in a single layer on paper-lined metal pans and frozen at a temperature of 0 deg. F. for 18 hours in the first experiment and two hours in each of the succeeding experiments. At the end of the freezing period the meat was ground in the frozen state, using a 0.25-inch cutting plate, and spread onto screen-bottomed trays at the rate of 1.5 lb. per sq. ft. of tray area. The trays were then placed in a cabinet dryer in which air, at a constant temperature, circulated through each tray of meat. After five to eight hours of air drying the trays of partially dehydrated meat were removed to a plate-vacuum dryer operating at a 28-in. vacuum and dehydration was continued at the same temperature as that employed in the air-drying process. Drying in vacuo was con-

* The study was carried out cooperatively by the Animal Husbandry and Zoological Divisions of the Bureau of Animal Industry at the Agricultural Research Center of the United States Department of Agriculture at Beltsville, Maryland.
** Resigned.

This cabinet dryer is similar to the type used in studies on trichinae in pork.

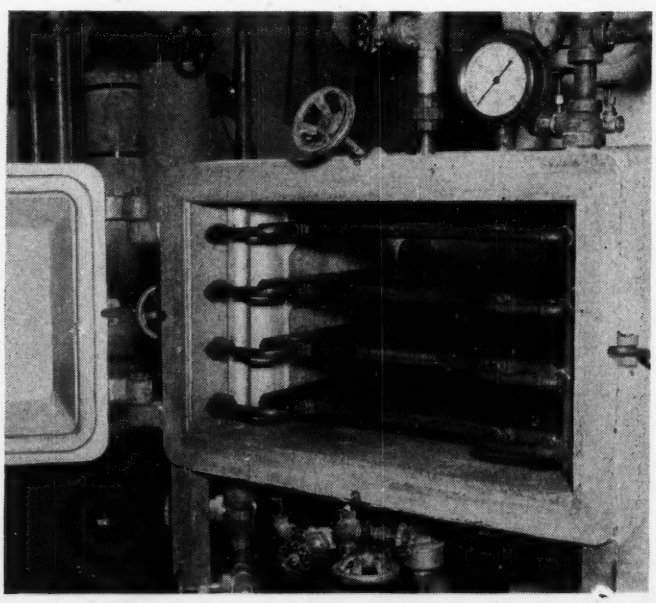


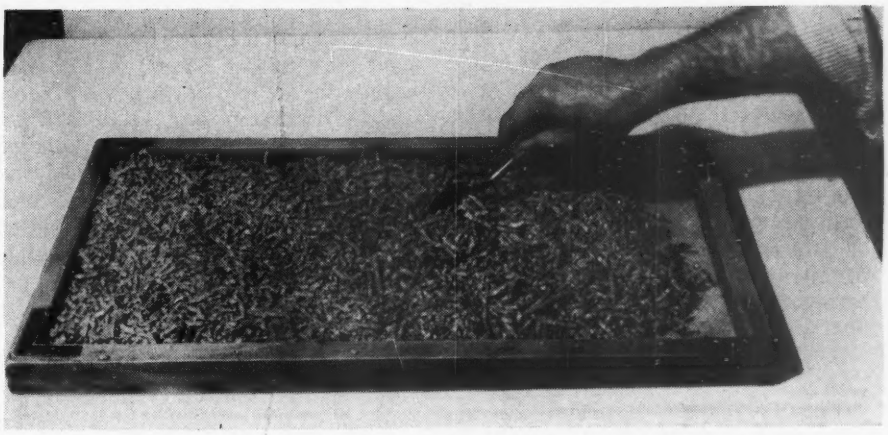
Plate-vacuum dryer used in second stage of dehydration to reduce moisture content to very low levels.

tinued for periods of 40 to 48 hours.

Tests of the viability of the trichinae were made by digestion and rat-feeding technics before, and at intervals during, the dehydration process. The digestive fluid employed consisted of water (temperature 98 deg. F.), 1,000 c.c.; spongy granular pepsin, 2.5 grams; salt, 3 grams; and hydrochloric acid, 10 c.c.; 600 c.c. of the fluid was utilized for each 50 grams of meat and the digestion process was continued for 18 hours at a temperature of approximately 98 deg. F. At the end of the digestion period the larvae were sedimented out of the digestive fluid, washed in physiologic saline, and examined microscopically for signs of life. Larvae that were colorless and relaxed into the form of the numeral six were considered dead. Other larvae that were only partially relaxed but failed to respond to stimulation by pressure with a warm needle were also considered dead.

In the feeding tests three medium-sized trichina-free rats were employed for each sample tested, and were fed the meat exclusively for three consecutive days. Thirty days after the last meat feeding the rats were killed, skinned, and eviscerated and the presence of larvae in the masculature was ascertained by digesting the carcasses in their entirety. Due to the large numbers of viable larvae present in some of the meat samples, a number of rats died within two weeks after feeding was initiated; in such cases, the small intestine was examined for the presence of adult trichinae.

The initial test of the viability of the parasites in the test meat was made immediately after slaughter of the hog; the diaphragm was utilized for that purpose. Samples for further tests of the viability of the trichinae and/or for moisture determinations were taken: (1) immediately after grinding, (2) at one- or two-hour intervals during the air-drying process, and (3) after 16, 20, 24 and 40 or 48 hours of vacuum drying. Those portions of the meat samples intended for the use in moisture determination tests were immediately placed in metal containers that were hermetically sealed to prevent further changes in moisture content of the contained meat; determinations of the amount of moisture present were later made, using standard technics. Those portions of the samples intended for tests of the viability of the contained trichinae were placed in glass jars and mois-



Spreading ground, frozen meat on screen-bottom tray preparatory to dehydration.

TABLE I—Results of Experiments on the Destruction of Trichinae in Raw Pork by Dehydration at Temperatures of 120° F., 102° F., and 70° F.

Condition of Meat Sample	Moisture content Percent	Viable larvae present Percent	Rat feeding tests	Moisture content Percent	Viable larvae present Percent	Rat feeding tests	Moisture content Percent	Viable larvae present Percent	Rat feeding tests
Experiments at 120° F.									
	1			2			3		
Before freezing	..	100	Pos.	..	100	Pos.	..	100	Pos.
After freezing and grinding	..	20	Pos.	..	70	Pos.	64	70	Pos.
Air dried (hours)									
1	45	9	..	38	70	Pos.	..	..	Pos.
2	29	3	..	25	63	Pos.	43	29	Pos.
3	21.50	2.50	..	15	9	Pos.	..	..	..
4	9.50	1.50	..	11	3	Pos.	31	13	Pos.
5	6.50	0	..	8	0	Neg.	..	..	..
6	..	..	..	..	..	..	12	1.8	Pos.
7	..	..	..	..	..	..	9	0	Neg.
8	..	..	..	..	..	..	..	..	..
Vacuum dried (hours)									
16	2	0	..	0.9	0	Neg.	5	0	Neg.
20	1.5	0	..	0.8	0	Neg.	3	0	Neg.
24	1.0	0	..	..	..	..	2	0	Neg.
40	0.8	0	..	1.0	0	Neg.	2.5	0	Neg.
48	..	..	..	..	..	..	..	..	..
Experiments at 102° F.									
	4			5			6		
Before freezing	..	100	Pos.	..	100	Pos.	..	100	Pos.
After freezing and grinding	..	86	Pos.	71	70	Pos.	63	67	Pos.
Air dried (hours)									
1	41	41	Pos.	..	..	..	..	..	..
2	22	27	Pos.	44	56	Pos.	46	24	Pos.
3	15.5	14	Pos.	..	..	..	..	..	..
4	10	7	Pos.	22	42	Pos.	40	16	Pos.
5	8	4	Pos.	..	..	..	..	..	..
6	5.8	0	Pos.	10	12	Pos.	22	10	Pos.
7	4.5	0	Neg.	..	..	..	..	..	..
8	..	..	..	7	0	Pos.	12	5	Pos.
Vacuum dried (hours)									
16	4	0	Neg.	0.5	2	Neg.	4.3	0	Neg.
20	..	..	..	0.5	0	Neg.	4.2	0	Neg.
24	3.8	0	Neg.	..	..	..	3.8	0	Neg.
40	..	..	..	..	..	..	2.5	0	Neg.
48	..	..	..	..	..	..	2.0	0	Neg.
Experiments at 70° F.									
	7			8					
Before freezing	..	100	Pos.	..	100	Pos.			
After freezing and grinding	..	70	Pos.	..	96	Pos.			
Air dried (hours)									
1	51	57	Pos.	43	97	Pos.			
2	42.5	51	Pos.	36	90	Pos.			
3	33	63	Pos.	30	92	Pos.			
4	27.5	53	Pos.	27	78	Pos.			
5	21	33	Pos.	26.5	86	Pos.			
6	17.5	23	Pos.	22	89	Pos.			
7	16	21	Pos.	19.5	23	Pos.			
8	12	17	Pos.	19	23	Pos.			
Vacuum dried (hours)									
16	6.1	0.005	Pos.	13	14	Pos.			
20	4.8	0.003	Pos.	9.3	0.32	Pos.			
24	..	..	..	6.8	0.16	Pos.			
40	..	..	..	..	..	..			
48	..	..	..	..	..	..			

tened in order to bring the meat to approximately its original moisture content; the samples in question were then held at a temperature of approximately 35 deg. F. until tested.

In experiments 1, 2, and 3, dehydration was accomplished at the temperature of 120 deg. F.; in experiments 4, 5, and 6 the temperature of 102 deg. F. was utilized; in experiments 7 and 8 the meat was dehydrated at the temperature of 70 deg. F.

Experimental Findings

Results of the experiments are summarized in Table I. It will be noted that in the digestion tests of the viability of the larvae that were made on samples of muscle tissue removed from the hog immediately after slaughter, no dead trichina larvae were found and rat-feeding tests were positive. In experiments 2 to 8, inclusive, digestion tests made on samples collected immediately after grinding the frozen meat showed that from 67 to 96 percent of the larvae survived the freezing periods utilized; rats fed small quantities of the meat became heavily infected. In experiment 1, however, where the freezing period was 18 hours, a digestion test showed that only 20 percent of the larvae were alive. However, heavy infestations were obtained in rat-feeding tests.

Dehydration at a temperature of 120 deg. F. (Experiments 1, 2 and 3): At this temperature the lowest moisture content at which live trichina larvae were found by the digestion technic was 9.5 percent. This was in a sample collected after 4 hours of air drying, 1.5 percent of the larvae recovered being alive; no rat-feeding test was made (experiment 1). The table also shows that no live larvae were found in samples having a moisture content of 9 percent or lower, and rat-feeding tests were uniformly negative (experiments 2 and 3).

Dehydration at a temperature of 102 deg. F. (Experiments 4, 5, and 6): In the experiments carried out at this temperature, death of the larvae was somewhat less rapid than at the higher temperature just discussed. In the case of experiment 5 a small number (2 percent) of feebly active larvae was recovered in the digestion of a sample of meat having a moisture content of 0.5 percent (air dried 8 hours, vacuum dried 16 hours); the rat-feeding test was negative, however, which shows that the viability of the parasites had been destroyed. In experiment 4, a rat-feeding test made on a sample having a moisture content of 5.8 percent (air dried 6 hours) was positive although no live larvae were found in the digestion test. Digestion and rat-feeding tests made in this experiment on samples having moisture contents less than 5.8 percent were consistently negative. In experiment 6 viability tests made on samples having moisture contents of 4.3 percent or less showed that the viability of the larvae had been destroyed.

Dehydration at a temperature of 70 deg. F. (Experiments 7 and 8): As can also be seen in the table, dehydration at 70 deg. F. was slower than at the higher temperatures, and the rate of death of the larvae was consequently less rapid. For example, in experiment 7 a sample taken after 8 hours air drying and 20 hours vacuum drying had a moisture content of 4.8 percent and live larvae were found by the digestion technic and the rat-feeding test was positive. In the case of experiment 8, dehydration was even less rapid. A sample taken after 24 hours dehydration in vacuo had a moisture content of 6.8 percent. The digestion test carried out on the sample in question revealed that some of the larvae were still alive, and the rat-feeding test was positive. No further

(*Turn to page* 210)

Tight-wrapped Shipping Containers

Kraft paper, when used as a wrapping for fiber containers exposed to wetting, increased their ability to withstand handling from 50 to 150 percent

DURING the extreme paper shortage of the war years, any method of packaging that was profligate in its use of paper was hopeless, despite the fact that paper was cheaper than steel. Even now there is no reason to encourage greater use of paper than the absolute minimum. With that idea in mind, the following is merely for the record. You may want to utilize the principles at some time in the future.

A test was made several years ago at Container Testing Laboratory, New York, to measure the value of tight-wrapping with kraft paper as a method of protecting corrugated and solid fiber food shipping containers against wetting in tropical islands. This was before the development of V-1 and V-2 fiberboard for weatherproof military packaging. This report is not considered official, for it is made from notes that are now several years old.

In general, a number of shipping containers holding 24 No. 2 cans were tested, some without wrapping, others tight-wrapped with kraft paper glued on to the container at every point. After drying the glue, the containers were sprayed with water for one hour and then tested to failure in a drum tester. The results below were noted at the time.

This fragment of packaging experience is published as suggestive, not as conclusive.

Results of Testing Cartons in Drum Tester

Size of Container	Type of Container	Weight of board per 1,000	Type of wrappings kraft paper	Wetting time, hours	No. of drops to produce: 6-in. split	Failure
24/2	Corrugated	50-55 lb.	None	None	114	127
24/2	Corrugated	50-55 lb.	None	1	...	54
24/2	Corrugated	50-55 lb.	Diagonal, single	1	...	78
24/2	Corrugated	50-55 lb.	Diagonal, single	1	...	103
24/2	Corrugated	50-55 lb.	Square, single	1	135	159
24/2	Corrugated	50-55 lb.	Square, double	None	...	377*
24/2	Corrugated	50-55 lb.	Square, double	None	...	500
24/2	Corrugated	50-55 lb.	Square, double	1	107	148
24/2½	Solid	100 lb., Type A	60 lb., sized None	1	...	73

*Had not burst open, but container was reduced to softness. Tested to 500 drops, it did not rupture.

Why Best Foods Photocopies Monthly Sales Records

By EDWARD A. LOVELOCK, Comptr., Best Foods, Inc., Bayonne, N. J.

Puts records in hands of all supervisory and sales personnel within five days after the close of each month. This rapid control permits close supervision of the sales force and maintenance of adequate stocks on retailers' shelves

NOTHING is worse, from Best Foods, Inc. point of view, than to have a customer look or ask for Hellmann's Mayonnaise—or any other Best Foods product—only to learn that it is out of stock. All our efforts go for naught when that happens. During the war, some of this was unavoidable. Demand far outstripped the supply of Nucoa Margarine, Hellmann's and Best Foods Real Mayonnaise, and Shinola Shoe Polishes. It was essential that we assure equitable distribution of the products to meet consumer demand, built up by the extensive advertising and sales promotion programs, to as great an extent as possible.

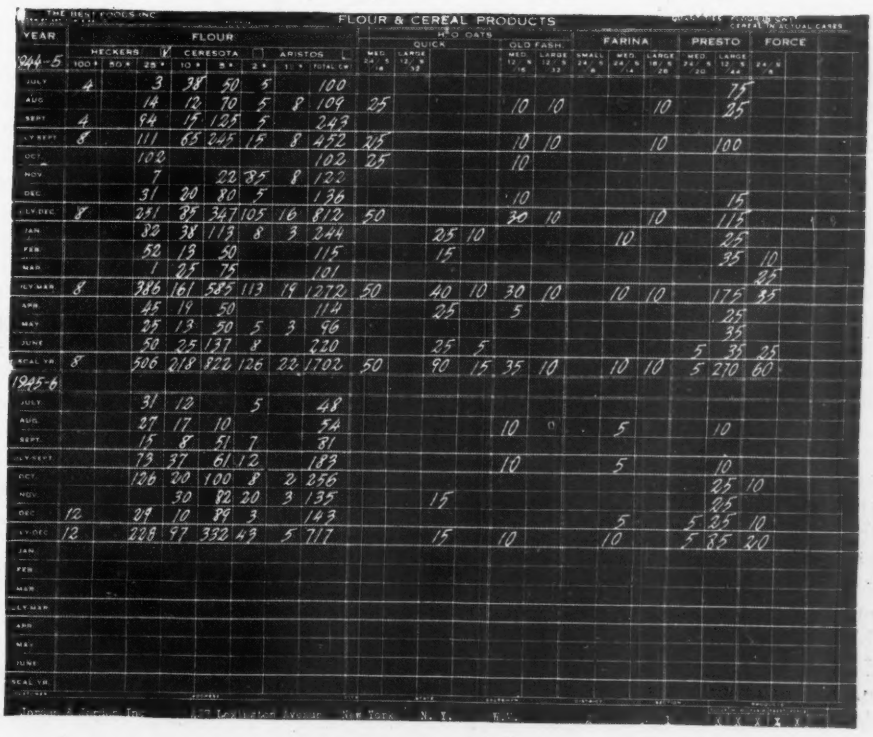
As conditions return to normal and all brands of food products again compete aggressively for the housewife's grocery money, it is necessary to be sure that Best Foods products are available in every logical outlet at all times.

The company, of course, has always kept statistical records for sales control purposes. Its management realized, however, that its sales control was not accomplishing all that it had a right to expect. For some time, it was evident that a new record keeping system must be perfected and that the numerous requirements for a satisfactory solution to the problem would definitely necessitate expert advice. Speed was one of the foremost factors to be considered. Every minute a salesman has to wait for statistical data may mean the loss of sales. A method was needed to assure the most efficient service possible. That is when Best Foods, Inc., called in the systems division of Remington Rand, Inc.

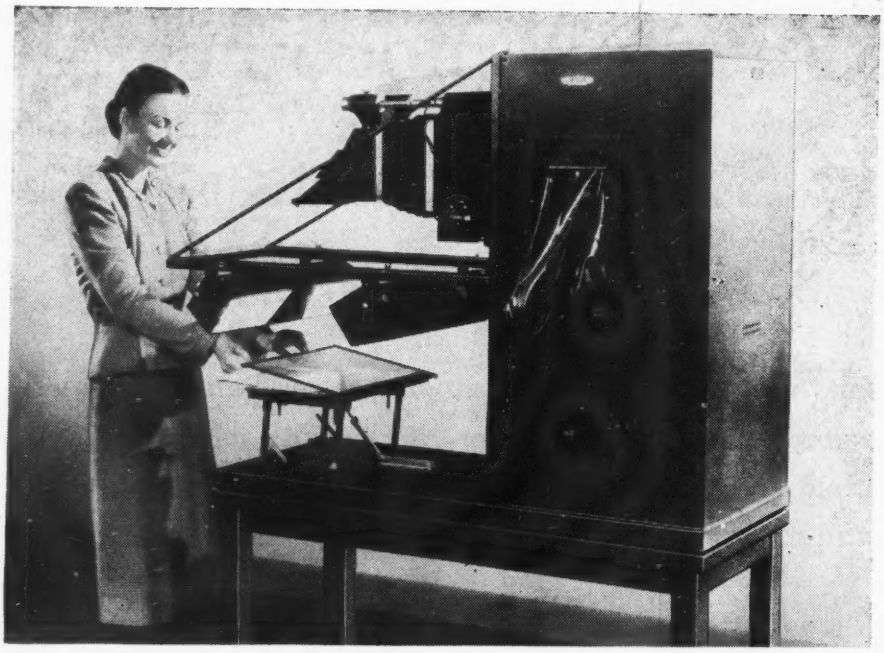
After considering various methods of sales control used by different organizations, the management concluded that a combination of properly organized Kardex records, with Dexigraph preparation of statistics, would be most suitable for keeping its flour and cereal records. This method has now been extended to the shoe polish product. This Kardex-Dexigraph system was chosen for many reasons, but chiefly because it is the fastest, most economical, and most effective sales control tool available. We installed it about a year ago.

Timeliness of reports, being a fundamental consideration, the set-ups and routines were planned for simplicity and certainty of operation so that waste motion and needless complications would not introduce delay. Salesmen now have a running historical record by customer and by product, with the pertinent information up-to-date. These figures are available within four or five days after the close of each month. The former method took from 20 to 25 days, which made them far too late to be very useful. Furthermore, it included only flour and cereal products and took five times as long to prepare.

A record is maintained in each regional office on 11x9-in. cards, filed visibly in cabinets. Two cards are used in each pocket. The card in the upper pocket is a detailed record of sales by date, invoice number, and product. This is recapped monthly and posted to the card in the lower pocket. This card provides for quarterly cumulative recaps on a fiscal year basis. The life of these cards is



Typical record card photocopy.



Operating Dexigraph to copy records.

four years, so that annual comparisons and comparisons to previous years, month by month, and cumulatively by quarters can be made.

It is hard to conceive of a much simpler way to accumulate sales by customer and product than this Best Foods method. Visible margins are skillfully used to facilitate finding and speed posting of sales data. The margins show the customers' names, addresses, salesman, district and section, and purchase of individual product lines. At the close of the month, clerks in the regional offices at New York, Chicago, San Francisco, and Atlanta rapidly total the postings on the upper cards and enter them on the lower cards.

Photocopies Save 15 Days

In New York and Chicago, we have contracted to have a camera sent to our offices each month. Three photographs of each card in the lower pockets are taken. In San Francisco and Atlanta, where this service is not available, we have bought our own cameras and make our own photocopies.

These are reduced from 11x9 in. to 8x6 in. Thus, there is the advantage of posting to a comparatively large form that does not require the clerks to make an effort to cramp their figures and to arrive at compact records for those who use the copies. These photocopies are available four or five days after the close of the month. It would be out of the question to prepare them in anything like the same time, or at so little cost, by any manual or typewritten transcribing method. While it is naturally pleasant to find that we save money by photocopying; the big advantage is in the saving of four-fifths of the time formerly required. This means that the figures are available in time to effectively use them to get business and to be sure that retail outlets are stocked.

Records are no good unless they are used. These are in daily use throughout the organization. One copy is sent to the district office, one to the sales supervisor and one to the salesman. The regional office copies are filed in visible cabinets of the proper dimensions. Those for the supervisors and salesmen are punched to fit loose-leaf binders so that these men can carry them conveniently.

There are numerous advantages to having these records in the hands of salesmen and supervisors early in the month. With this knowledge, they can plan their work intelligently. They can route themselves to get to the spots that need attention in time to do some good but without excessive waste of time and money in traveling. By soliciting business at the right times and in the right places, their calls are more productive and their volume is increased. Salesmen can and do talk facts and figures because they have them in black and white. They can and do point out the volume and profits the dealer can make, by selling Best Foods products aggressively and by tieing in with the Best Foods advertising and merchandising programs.

The district and regional sales managers also work from these records, using them to review the work that is being done and to suggest to the supervisors ways and means of doing a better job. They also use them in conjunction with the overall monthly and quarterly district and regional summary reports to trace down the underlying causes of significant changes, so that these reports become an aid to management. From the regional sales managers down to the individual salesmen, efforts are concentrated on the places that need attention.

Naturally, this is profitable to the salesmen, to the management and to the stockholders of Best Foods, Inc. This increase in sales efficiency (which insures that customers, won by its advertising and sales promotion, will be able to buy what they want when they want Best Food products) is made possible by a record keeping system that actually costs less than the old system.

Some of the many items to be watched.

INEFFICIENCY PREFERRED!

A gloomy picture confronts the fluid milk industry as unionized route salesmen refuse to continue the efficient wartime system of every-other-day delivery. Paradoxically, this situation portends higher prices, curtailment of jobs and reduction in sales

By ALEXANDER MORROW,* Chestnut Hill, Pa.

AMID the present labor turmoil, the controversy over every-other-day delivery that has arisen in many cities between milk drivers and distributors has probably attracted scant attention. Of course, it hardly compares in scope with the conflicts that are looming on a nation-wide scale. But the principle involved is one that has been contested innumerable times since the Industrial Revolution and is certain to recur as long as more efficient methods of conducting a business operation are devised. The question is one with broad implications for all industries that restricted delivery operations during the war.

During the war, the Office of Defense Transportation, in order to conserve scarce materials and labor, issued an order placing retail milk delivery upon an every-other-day basis instead of the traditional daily delivery. Only half of the customers on a particular route would receive deliveries on a given day. Each customer would then be served a two days' supply. Since the routeman would cover only half of his route during one day he would traverse less distance and he could thereby increase the number of his customers without making a greater effort. In this fashion, routes were consolidated and the number of men and vehicles required to deliver a given quantity of milk were reduced.

Many other economies were also instituted during the war. Among these was the rule that deposits must be charged for bottles, that a retail store could obtain milk from only two distributors, that unsold milk could not be returned, that milk could not be sold for consumption off the premises in containers of less than a quart and that special deliveries were eliminated. But the alternate-day delivery plan was the most important of all of these measures.

Savings Realized

This delivery plan is a change in marketing practice and does not have the drama of some new invention in the field of industry. Yet, it has been extremely effective in lowering the costs of distribution in an industry that has long needed innovations in that phase. For example, the Storrs Agricultural Experiment Station studied the savings resulting in the State of Connecticut from the adoption of every-other-day delivery. In terms of resources, these amounted annually to 1,000,000 gallons of gasoline, 2,000 tires, 46,000 quarts of oil, 530 truck-years, and about 1,000,000 man-hours.

These savings of critical commodities were, of course, of inestimable benefit during the war. But monetary costs were also reduced sharply. Indeed, in New York City, as an illustration, the adoption of every-other-day delivery resulted in a saving of nearly one cent in the cost of delivering a quart of milk to consumers. These savings would have been greater by one-half cent per quart if higher wages had not been granted.

As the end of the war approached, distributors considered the advisability of continuing alternate-day delivery. Distribution costs had been lowered and consumer surveys indicated that a majority of the public favored retention of every-other-day service. After V-J Day, the Office of Defense Transportation announced that Order 17, making every-other-day delivery mandatory, would expire on November 1, 1945.

Conferences were then held in various cities to determine how every-other-day delivery could be retained. In many markets, dealers decided to continue this form of delivery. In some states milk control boards were considering the prohibition of daily delivery as an industry practice.

TABLE I—Retail Delivery Route Time, Before and After the Adoption of Alternate-day Delivery.[1]

	Every-day delivery			Alternate-day delivery			
Type of adjustment	No. of routes	Total quarts	Average hr. per route	No. of routes	Total quarts	Average hr. per route	Percent reduction in total time
Split routes	76	21,767	7.2	76	22,078	5.0	30
Partial consolidation	99	30,210	6.9	73	29,290	6.9	25
Doubled routes	10	2,373	4.9	5	2,358	5.2	48
All routes[2]	185	54,350	6.9	154	53,276	6.1	27

[1] From Page 12, Bulletin No. 247, Storrs Agricultural Experiment Station, University of Connecticut.

[2] All routes for which time estimates were available.

* The author is the market analyst of a large Philadelphia dairy company, but emphasizes that his views do not necessarily reflect that of his employers.—Ed.

Oppose Daily Delivery on Basis of Economy

Most routemen are paid wholly or in part in the form of commission. Since every-other-day delivery made it possible for them to deliver a larger quantity of milk without making a greater expenditure of time and effort, they were at first prone to favor its continuance. However, the AFL recommended a return to daily delivery to all of their locals and this has influenced the attitudes of many of the local officials.

Their opposition to every-other-day delivery undoubtedly arises from the fact that the total number of delivery jobs, at a given volume of business, would be curtailed unless a return were made to daily delivery. This, however, is an extremely narrow view, from the long-term viewpoint of delivery employees. A return to daily delivery would involve an immediate increase in the number of routes. But the question is not as simple as all that: a return to daily delivery would also involve an increase in the price of milk.

The milk distributors cannot absorb the additional costs that a return to daily delivery would entail. For, despite a common belief to the contrary, the profits enjoyed by milk dealers are limited and certainly below the average for all companies in the United States. Six leading milk companies in New York State had net earnings, after income taxes, of 0.2 percent of net sales in 1941 and experienced a loss in 1942. In 1943, net earnings, after taxes, averaged 0.9 percent and in 1944 the corresponding figure was 1.5 percent of net sales. In 1944, which was the best year during the war period, earnings, after taxes, averaged 5 percent of net assets. These earnings are obviously modest. They certainly indicate that the price of milk would have to be increased to cover additional costs.

Changes in Distribution Costs

Milk companies have long been subject to hostile public criticism because the price of milk has been considered unduly high. The public has scarcely realized that 70 percent of the dealers' costs consist of wages. The lowering of the price of milk would require the more efficient utilization of labor and the lowering of labor costs per quart of milk.

In the milk distribution business, however, there has not been that remarkable increase of productive efficiency which has characterized the preponderant part of American industry. First, distribution in general has not enjoyed the increasing efficiency which has been the triumph of mechanized industry. Second, during the decade before Pearl Harbor, economic conditions in general and those in the milk business in particular, reduced the efficiency of milk distribution.

Since the amount of capital required to enter the milk business is relatively small, many persons who were otherwise unemployed became dealers on their own. This led to a demoralized industry and a competition which took the form of costly and unnecessary services. There followed an increasing shift to the purchase of milk at the store. Price differentials in which milk could be purchased more cheaply at the store became extremely prevalent. Indeed, in many markets the number of routes tended to decline because the growing shift to the purchase of milk at the store required a smaller number of routes to deliver a given quantity of milk.

Meanwhile, the wages of delivery labor had remained very near the level of 1929. Since the price paid to the producers had declined, this necessarily meant that distribution costs became a larger proportion of the total cost of getting a bottle of milk from the farmer to the consumer's doorstep.

The milk industry was rescued from this demoralizing state by the advent of the war. First, the rise in consumer incomes and, second, the adoption of wartime economies reduced milk distribution costs even though various operating costs were rising. This reduction was achieved by the simple fact that the load per route had risen substantially, by changes in marketing practice which did not injure the consumer.

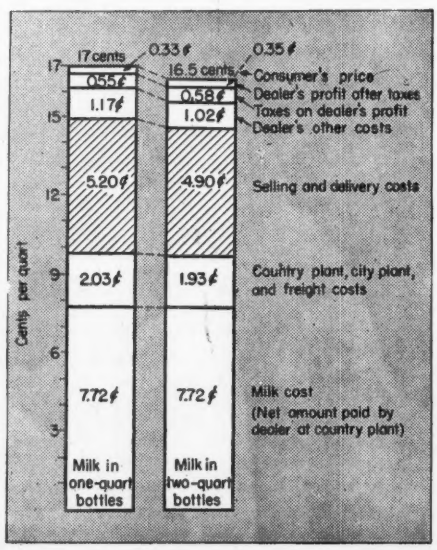


FIG. 1. Components of the consumer's price for standard milk delivered to homes in New York City, 1944.

What Happens Now?

At present there is a campaign to revert to the conditions that prevailed before the war. It is true that a return to prewar delivery practice would entail, in the New York area, for example, the operation of approximately 30 percent more routes. In the war period, the price differential between milk purchased at the store and delivered to the doorstep narrowed. The return to daily delivery would tend to widen that differential again. A larger percentage of consumers would once more shift to the store. Since store routes handle a larger quantity of milk, fewer routes are required to serve stores than are needed to deliver the same volume to the homes of consumers. The number of jobs would thus be reduced over a period of years.

The high price of fresh milk would, however, also curtail the volume of sales. In the two decades between the wars, the consumption of evaporated milk doubled while that of fresh milk remained stationary. Considerable evidence exists that an increase in the price of fresh milk led people to substitute evaporated milk. In World War II, the use of dried milk was extremely widespread among the members of the Armed Forces. Unless the cost of distributing fresh milk can be reduced, its sale will increasingly yield ground to the alternative forms of the product.

In an industry that revolves principally about distribution, the reduction of costs can only be achieved by lessening the amount of service or rearranging the distribution functions performed. Either or both of these methods will lead to larger loads and lower costs.

But if labor resists any change that will enlarge loads and curtail costs, then efficient delivery cannot be achieved. Even though the improvement is something as intangible as the type of service, we have here opposition to more efficient operation. The consumer will not only have to pay higher prices, but the industry in which the routeman earns his living will be injured and even its future may be imperiled. The public may shift to substitute forms that will not suffer from high-marketing costs. The AFL has evidently failed to learn the lessons of the war years. Unfortunately, the failure will affect a number of industries.

The Root of "POOR RICHARD'S" Trouble

By DIRECTOR OF RESEARCH AND DEVELOPMENT, COMPANY H

Since "Poor Richard's" commentary on Salaries for Food Technologists appeared in October, 1945, a flood of reader reactions has come to the editors. The idea that underlies many comments is that the universities are at fault by failing to teach students: (a) how to handle themselves with realistic confidence, (b) that science is frequently a means to an end — not necessarily an end in itself, or (c) that exaggerated humility and modesty is a detriment to the scientist in industry. — The Editors

MANY of the statements made by Poor Richard may be regarded as controversial. Many of the ideas, however, are based on a situation which is regrettably very unsatisfactory.

A number of important items, it is believed, were omitted in the discussion. No salary schedules are given for salaries in equivalent positions in other industries, such as the pharmaceutical, textile, and chemical industries. The survey made by the American Chemical Society seems to indicate that chemists are paid about as well as professional people in other activities. It is assumed that food technologists were included as chemists in this survey. Has anyone made a study of the salaries of food technologists to see how their situation compares with the situation of chemists included in the study made by the American Chemical Society?

The author also states that no information exists for the evaluation of the chemist from an industrial point of view. It is true that the report of the American Chemical Society covers the chemist, regardless of his industrial or scholastic connection. And it does serve as a valuable reference point.

We have several factors to contend with in the food industry. In the first place, most universities have no organized course in food technology. The food industry is a terrifically complex one. It involves chemists, physicists, engineers, physiologists, pathologists, M.D.'s, veterinarians, nutritionists, botanists, bacteriologists psychologists, and workers from many other branches of science. A course in food technology may now be planned to give one an understanding of the basic sciences with some degree of expertness in one or two applications. In the past, the food industry has hired people of various types of training—many of them well trained in their particular science, but unfortunately not acquainted with the particular processing and chemical engineering problems involved in food production. Undoubtedly, neither industry nor the scientific man understood the complexity of the situation. Yet, the food industry often expected the scientific man to handle industrial problems, for which he was not adequately prepared, or which were too broad for one man to handle. Furthermore, scientific men involved in such situations were paid on the basis of control laboratory men and not on the basis of production men or high-grade research men.

Instances of unfortunate job allocations are frequently encountered. In one case, an expert physiologist was trying to become a chemical engineer practically overnight. In another case, a well-trained bacteriologist, who had devoted much of his time to problems related to research in pure bacteriology, was setting out to control production in a plant where troubles were largely caused by improper engineering.

Men who leave the university trained in fundamental science, often have no business experience. They know very little about business management, hiring of personnel, and many other problems, such as handling clerical work, auditing and making contracts. These matters usually have been of little interest and are likely to be unfamiliar to them. When engaged in industrial work, however, these problems must be mastered or the management will take them over and the technical man will simply carry on as a special worker to assist management.

The food industry has had an opportunity to select men from widely varying degrees and types of training; men with good personalities and with scholastic records, which indicated that they had passed the highest requirements of the university. The salaries offered may not have been comparable to the salaries of those in other industries with similar responsibilities, partly because of the wide and diversified field covered by the food industry, and partly by the lack of a specific professional class. Often there were only a limited number of openings in industry for certain types of training, such as pathologists and mycologists.

A great many men have entered the industry with the object of carrying on pure research. Unfortunately, the food industry has heretofore not supported very much fundamental research. As a matter of fact, support of fundamental research in the food industry is extremely difficult. The problems involve chemistry, engineering, agriculture, home economics, plant breeding, processing, study of climate, soil and other factors. Consequently, research of this type becomes a matter of using variably trained personnel. It is economically expensive and involves years of research. The man who tries to do pure research, therefore, may find his future rather limited. He may finally decide to enter production. He may have worked a number of years at an indifferent

(*Turn to page* 202)

Quality Control Means Better Packaging

The need for control of quality in packaging operations became obvious when meeting rigid military specifications. Here is the way to apply this valuable wartime heritage in any sort of food manufacturing plant

By D. M. BROWN, Assistant Superintendent,
American Chicle Co., Chewing Gum Manufacturing Division
Long Island City, N. Y.

WARTIME packaging, with its rugged requirements and special problems, proved the value of adequate quality control to those familiar with it and its need to those to whom it was not familiar. It insured that specifications, developed through test and experience, were met in a very high percentage of cases. The lessons and benefits of adequate quality control were learned the "hard way" during the war. We can profit by that experience.

No one will deny that, for the most part, packaging in peacetime will be vastly different from wartime. For one thing, the degree of protection required should be less. These peacetime changes will be in the specifications, but they should not lessen nor becloud recognition of the importance of quality control.

What Is Quality Control?

Quality control assures the maintenance of uniformity to accepted standards. As applied to packaging, it involves uniformity of materials, wrapping or sealing, and the life of the material, to insure that the product will reach the ultimate consumer in the desired condition.

To provide sound quality control to the packaging function, we must apply the 4 P's, which are:

1. Packaging requirements.
2. Pre-testing and control.
3. Production testing and control.
4. Post testing.

Packaging Requirements

The function of the first of these, packaging requirements, is obviously to find out what kind of packaging is required. It is senseless to use a wrapping of high impermeability to moisture vapor, that is usually relatively expensive, if the product does not require such protection. It is even more foolish to under-protect, resulting in the product reaching the ultimate consumer in an unsatisfactory condition and possibly putting the manufacturer out of business. To determine the packaging requirements, an intelligent survey of the product, including information on where and how it is to be sold, should be made.

What to Ask

The survey should include accurate answers to the following:

a. Does the product need protection against gain or loss of moisture, against light, heat, bacteria or dust?

b. Is the product sold largely in one region of this country, or is its sale widespread? What are the climatic conditions of these areas?

c. Is the product favored with a very rapid turnover, or will a fair percentage remain on dealers' shelves for various periods such as three months or more? Is its sale seasonable, with periods of rapid turnover followed by periods when turnover is slow?

A proper evaluation of such a survey should clearly indicate plus or minus limits within which the package to be selected must fall in order to do the desired job. Costs, machining qualities, display value, availability are other factors that are obviously of extreme importance and must be also weighed in the final selection of the package.

Assuming that the material for the package has been selected, we proceed with adequate pre-testing and control. First, we must determine the variations in the material. Are the qualities of one lot different from the next and, if so, how much?

Are these differences severe enough to require drastic changes in the functional useability of the material? This approach leads to the establishment of a series of characteristics that are the minimum requirements for the material and must be met by each lot before its use in the final package is permitted.

Safety Margin

The severity of these minima will indicate the test frequency for the material. For example, if the protection required is just under the protection afforded by a good run of the material, extreme care must be exercised in testing to be sure each lot, and all parts of the lot, will pass. If there is a comfortable margin between protection requirements and the protective properties of the materials, less testing is required. This points up the desirability of selecting a material better than actually required, if it can be obtained without increasing costs excessively.

To interject a word of caution, don't wait until the material is actually needed for packaging before testing it. Test far enough in advance to insure an adequate supply of satisfactorily tested material. This is important in order to take corrective measures soon enough to avoid costly interruptions in production.

Pre-Testing

The best material in the world, properly tested, will be ineffective if it is not correctly used. A material for a moisture-vapor-proof barrier is no better than its seal. A protective wrapping that is torn, scuffed or otherwise damaged, so that its protection is impaired, isn't going to do its job. Consequently, it is essential that adequate production testing

and control be provided. First, standards must be agreed to. In other words, what are we shooting for? Is an airtight package needed, or just one with a tack seal? Are appearance and attractiveness of prime importance, due to the appeal to the ultimate consumer, or does the product go to another producer for additional handling?

To set up standards requires an intimate knowledge of what the wrapping machine can produce. It involves the examination of large quantities of packages, along with studies of what the machine will do, and what will fulfill the packaging requirements. These limits, wherever possible, should be prepared in the form of physical standards for use by the inspection staff and should be in full view of the machine operators and handlers. People want to know what standards they are required to work toward. The best way of telling them is to show them actual exhibits.

Testing and Control

The frequency of tests or examinations is usually measured by the consistency of the wrapping or packaging machine. If a machine is likely to get out of control quickly or frequently, inspect its production results—the packages—at short intervals to maintain control. If experience has proved that the standards are readily and consistently met by the machine, less frequent inspection is required. Corrective measures must also be determined. If, for example, a perfectly registered wrapper is required, the action to be taken, such as immediately shutting the machine down for repair, must be agreed to. All these phases should be recorded so that a guide is always available for ready reference. Without such a record, it is conceivable that, in time, operations might get away from the original purpose, and with no one aware of it, bring a letdown in control. The consequences in such a case could be quite serious. The record should also require that the inspectors write down the results of each inspection. The mere act of recording tends to fix on the inspector a feeling of responsibility for the accuracy of his inspection.

Staff Selection

The selection of an inspection staff is of extreme importance and is the backbone of good production quality control. Responsible, alert and observant personnel, with sufficient tact to work in harmony with the production staff, are essential. As a final word, sufficient spot or unannounced checking must be carried out to insure against misleading information. Nothing is worse than to be told everything is under control and to find, one day, that for some time there has been an unrecognized downward trend in the quality of packaging.

It is always sensible to establish a file of production samples, adding to it representative packages from each day's production. Such a file is extremely useful for ready reference whenever questions arise concerning past operations—a frequent occurrence. They also serve as a basis for judging the effectiveness of the packaging by providing for re-examination of packages after, say, one, two and three months, to determine what, if any, changes have taken place in the product or package. This leads to the fourth and last function of quality control—post-testing.

Post Testing

Post testing is carried out to determine if all previous testing has been adequate and that all factors have been considered and covered. It truly follows the adage that "the proof of the pudding is in the eating." The first requirement is to obtain accurate reports on the condition of product at the point of ultimate consumption. In order to do so, it is well to supply the sales staff with a series of questions or illustrations typifying the information that is desired. Intelligent analysis and frequent summations of those reports will quickly uncover troubles along with the corrective measures that need to be taken.

Complaints Important

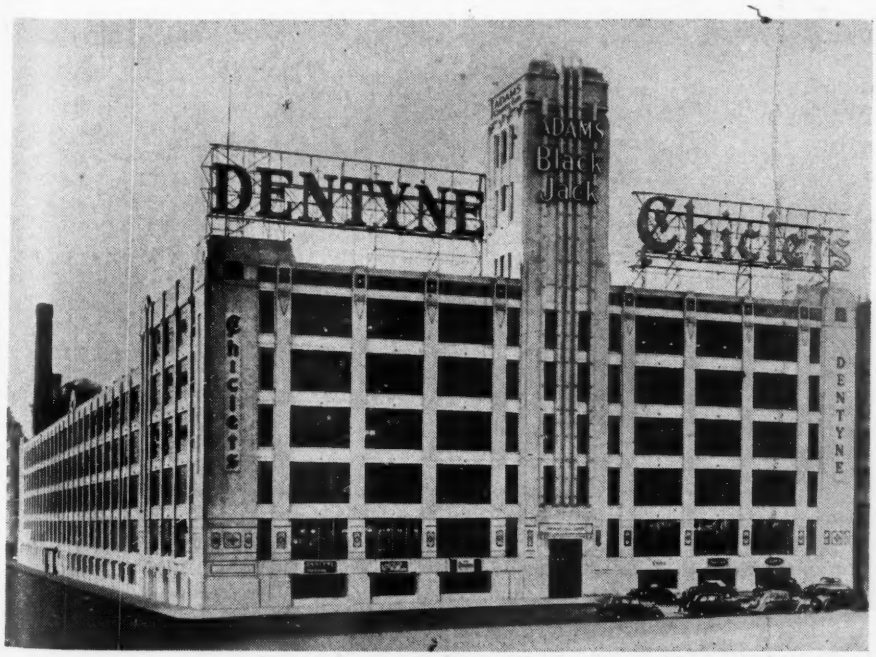
A second factor is complaints. The quality control department should review each and every complaint received and should investigate each one carefully, no matter how trivial or irrelevant the complaint appears to be. It is surprising how often a complaint will provide a lead to effecting an improvement in the quality of your product.

Lastly, it is sensible to provide for an independent check on the product periodically, at the point of ultimate consumption by a qualified observer. This can be done either by actually going out into the field or by having the sales staff return packages picked up at random in the trade.

Keep At It

Summed up, post testing determines if the analysis of the packaging requirements were correct and if pre-testing and production testing and controls are adequate. Post testing also enables the producer to constantly revise and improve his standards and thus steadily improve the quality of his product.

Good quality control is not obtained overnight. You have to keep at it everlastingly and never let up in order to obtain the fully recognized benefits in our quality conscious world of today and tomorrow.



The American Chicle plant in Long Island City, N. Y.

Gas-Packing Dry Whole Milk*

Replacement of oxygen, enemy of quality, by vacuumizing and filling head-space with inert gas is the obvious remedy. Entrapped air in microscopic cells makes it difficult, yet there are three ways to do it

By S. T. COULTER and ROBERT JENNESS
Division of Dairy Husbandry and Division of Agricultural Biochemistry
University of Minnesota, St. Paul, Minn.

STORAGE in an atmosphere essentially devoid of free oxygen is the most certain method of preventing oxidative rancidity in dry whole milk, as it is for other foods subject to this type of deterioration. This protection can be achieved either by vacuum-packing, (withdrawing the air and sealing in gas-tight containers under a vacuum) or by replacing the air with an essentially inert gas such as nitrogen or carbon dioxide. These protective measures, however, do not fully prevent deterioration of quality in dry whole milk although they are highly effective for other foods subject to oxidative deterioration.

Insofar as is known, the deterioration of dry whole milk is the same in a vacuum as in an atmosphere of nitrogen or carbon dioxide. The important consideration affecting the keeping quality of dry milk is the amount of oxygen present per unit of weight.

The actual mechanics of gas-packaging can be quite simple. The powder in unsealed cans is placed in a vacuum chamber, the air partially withdrawn with a vacuum pump and nitrogen then admitted to bring the pressure to about 1 lb. per sq. in. above atmospheric. The vacuum chamber is then opened and the cans sealed. Two methods are used to permit final sealing after gassing. The simplest is to use cans provided with lids, pierced with a 1 to 2 mm. hole through which the air is withdrawn and the nitrogen admitted. The hole is tip-soldered after the can is removed from the vacuum chamber. In the other method, cans are subjected to the first operation, seaming roll on a can-closing machine before vacuumizing and gassing, and afterwards are given the final, second operation, to effect a seal. Special arrangements are provided by the manufacturers of the closing machines to avoid partial sealing of the vacuumized cans by the pressure of the incoming nitrogen, which would prevent entrance of the nitrogen to the cans.

Three-minute Cycle

The vacuumizing-and-gassing cycle depends, in part, upon the capacity of the vacuum pump. If the air is withdrawn too rapidly some of the powder may be forced out of the cans by the expanding air. A three-minute cycle providing two minutes, or slightly less, for the vacuumizing, and the remainder for gassing and discharging and charging the chamber, is entirely practical.

The current Quartermaster Corps Tentative Specification, C.Q.D. No. 166A, requires that the oxygen content of the gases in the sealed container shall not exceed three percent (calculated to atmospheric pressure) after at least one week from the time of gas-packing. Statements of Army personnel and observations in many laboratories agree in indicating that dry whole milk gas-packed to meet this specification does not become tallowy. There is some evidence, however, (Lea, Moran and Smith[3]), that dry whole milk keeps better if even less oxygen is present.

The principal factor limiting reduction of the oxygen content in gas-packing most food products is the ability of the pump to evacuate the system. Theoretically, if a can is evacuated to "x" millimeters of mercury, and nitrogen is then admitted until the can is again at atmospheric pressure, the percentage of oxygen

TABLE I—Influence of Type of Drying System on Air Entrapment and Gas-Packing Efficiency
(See also Fig. 1 for further pertinent data)

Sample	Type of drier	Microscopic Measurements: Number of particles measured	Particles containing air cells (%)	Cell Vol. per gm. cu. cm.	No. of Detns.	Oxygen Content after 7 days[1]: Oxygen as Percent of gas Mean	S.D.[2]	Ml./100 gm. powder Mean	S.D.[2]
A (Plant 1)	1	...	....	....	13	3.85	0.28	...	...
B	..	481	89.4	0.176	8	3.24	0.56	2.67	0.47
C	..	448	56.2	0.021	4	2.38	0.15	2.07	0.13
A (Plant 2)	1	705	59.3	0.072	4	3.76	0.21	3.08	0.22
B	..	454	48.9	0.013	2	1.95	...	1.82	...
						2.12		1.94	
A (Plant 3)	2	...	...	....	13	2.51	0.30	...	...
B	..	1165	38.5	0.040	7	2.30	0.46	2.09	0.28
A (Plant 4)	2	1008	30.2	0.043	4	2.14	0.38	1.80	0.32
127.(U.of M.)	Regular	1023	25.0	0.020	4	1.87	0.26	1.78	0.35
138.(U.of M.)	Air-whipped into condensed	1050	31.3	0.140	2	3.25	...	3.14	...
						3.39		3.26	
A (Plant 5)	Centrifugal	...	...	....	4	3.10	0.38	2.40	0.30

[1]Packed in No. 2 cans. Weight was 0.50 gm./ml. for U. of M. powders and 0.54 gm/ml. for other powders. Gassed with nitrogen after evacuation to 0.5 to 5.0 mm. pressure.
[2]Standard deviation of single determination.

TABLE II—Reduction of Oxygen Level by Holding Bulk Powder Under Vacuum Before Canning as Compared with Regular Gassing Treatments

Oxygen Content after 7 Days[1]: Single Gassing		Double Gassing 24-hour interval		Under Vacuum 16 hrs. Released with N[2]		Under Vacuum 24 hrs. Released with air[2]	
percent	ml./100 gm.	percent	ml./100 gm.	percent	ml./100 gm.	percent	ml./100 gm.
1.79	1.74	0.61	0.59	0.75	0.70	0.59	0.55
1.70	1.66	0.55	0.53	0.68	0.64	0.48	0.45

[1]Sample was U. of M. 120. All evacuations were to 0.5 mm.
[2]After release of vacuum the powder was canned immediately, evacuated to 0.5 mm. and gassed with nitrogen.

*Scientific Journal series Paper, No. 2259, Minnesota Agricultural Experiment Station.

in the gases in the can may be computed by the following formula:

$$\text{Vol. \% } O_2 = \left(\frac{x}{760} \times 20.9\right) + \text{percent oxygen in nitrogen.}$$

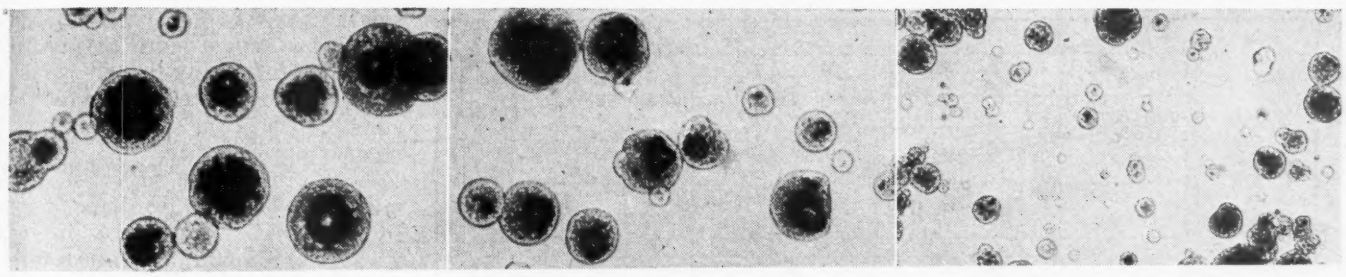
The calculated oxygen percentages after various evacuation pressures assuming pure nitrogen are as follows:

Pressure to which evacuated (mm)	Percent oxygen in gases
1	0.0275
5	0.1375
10	0.275
20	0.550
30	0.825
40	1.10
50	1.375

Why Oxygen Increases

The percentage of oxygen in the gases in cans of spray-dried whole milk closely approximates the theoretical value immediately after gassing, but, in marked contrast to the situation with most other foods, it increases gradually over a period of several days. The source of this "evolved" oxygen is air that was entrapped in the powder particles at the time of spraying. The air is present as cells that can be seen readily (Fig. 1) by microscopic examination of the powder dispersed in mineral oil. It is an interesting phenomenon that the pressure within the air cells during evacuation does not rupture them and release the air. The air in the cells must be at approximately atmospheric pressure and thus, the fact that the air is not released under a high vacuum, indicates that the cell walls can withstand an internal pressure of almost 15 lb. per sq. in. Contrariwise, large amounts of air are entrapped in the powder particles of spray-dried eggs, yet the oxygen content of the headspace gas in cans of dried eggs does not increase after gas-packing. The conclusion can be drawn, therefore, that in dried eggs the air-cell walls do not retain the air in the cells during evacuation.

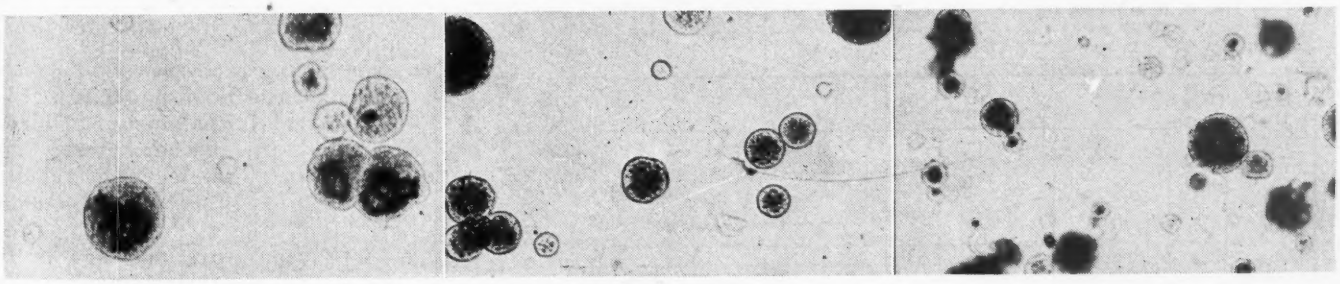
A dried egg product, however, prepared by spray-drying eggs, dispersed in a lactose sirup of such concentration that the lactose is present in approximately the same ratio to the egg solids that it bears to the other milk solids in milk (i.e., ratio = 5.0:7.5), exhibits the same behavior as dry milk in gas-packing. Troy and Sharp[5] and Sharp[4] have shown that the lactose in spray-dried milk is in the form of a highly con-



Plant 1. Type 1 Drier. Pressure spray. Sample B.

Plant 2. Type 1 Drier. Pressure spray. Sample A.

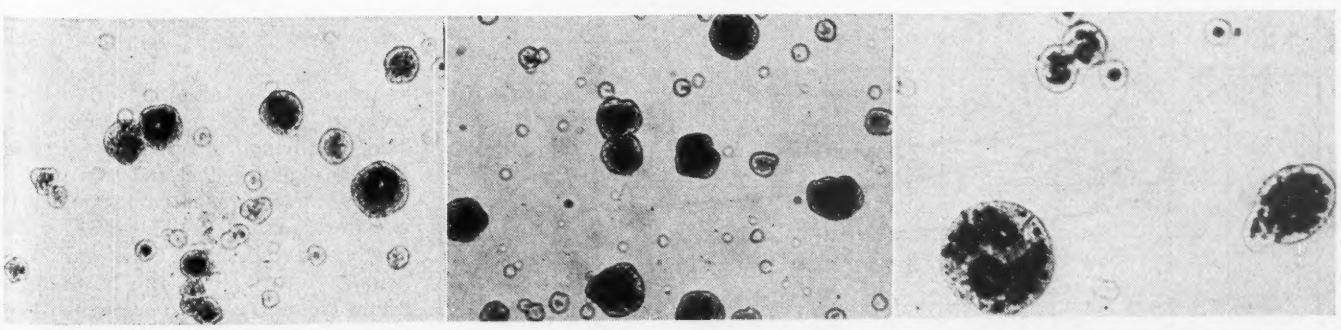
U. of M. Drier. Two-fluid atomizer. Sample 127.



Plant 1, Type 1 Drier. Pressure spray. Sample C. Condensed milk deaerated.

Plant 2, Type 1 Drier Pressure spray. Sample B. Condensed milk deaerated.

U. of M. Drier. Two-fluid atomizer. Sample 138. Condensed milk whipped.



Plant 3, Type 2 Drier. Pressure spray. Sample B.

Plant 4, Type 2 Drier Pressure spray. Sample A.

Plant 5, Type 3 Drier. Centrifugal spray. Sample A.

FIG. 1—Photomicrographs of whole milk powder particles. Note the empty air cells that create the oxygen problems.

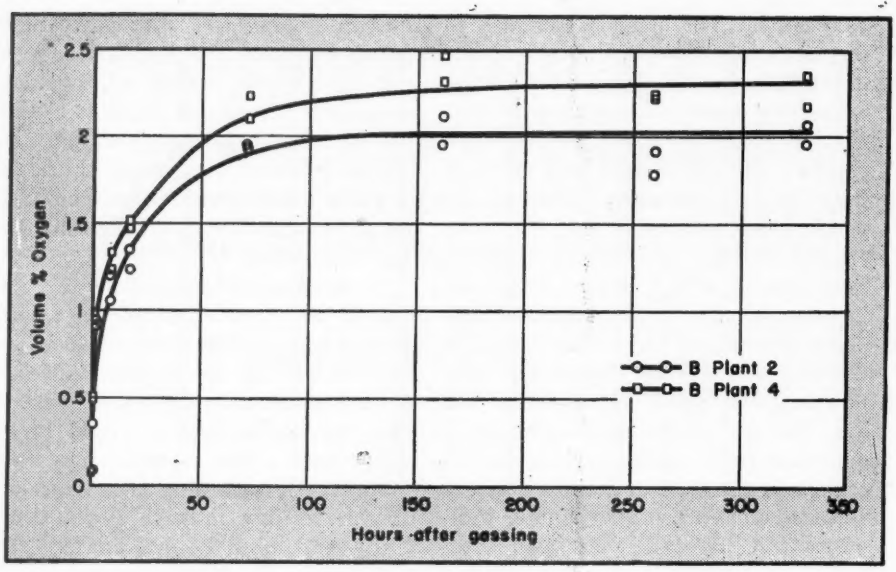


FIG. 2. The rate of equilibration of oxygen after gassing.

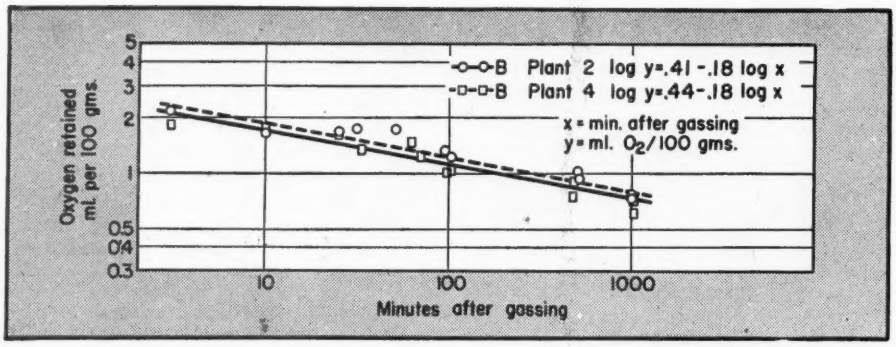

Oxygen retained ml. per 100 gms.
Minutes after gassing
B Plant 2 log y=.41-.18 log x
B Plant 4 log y=.44-.18 log x
x = min. after gassing
y = ml. O2/100 gms.

FIG. 3. Relation of retained oxygen to time after gassing. (Logarithmic scale.)

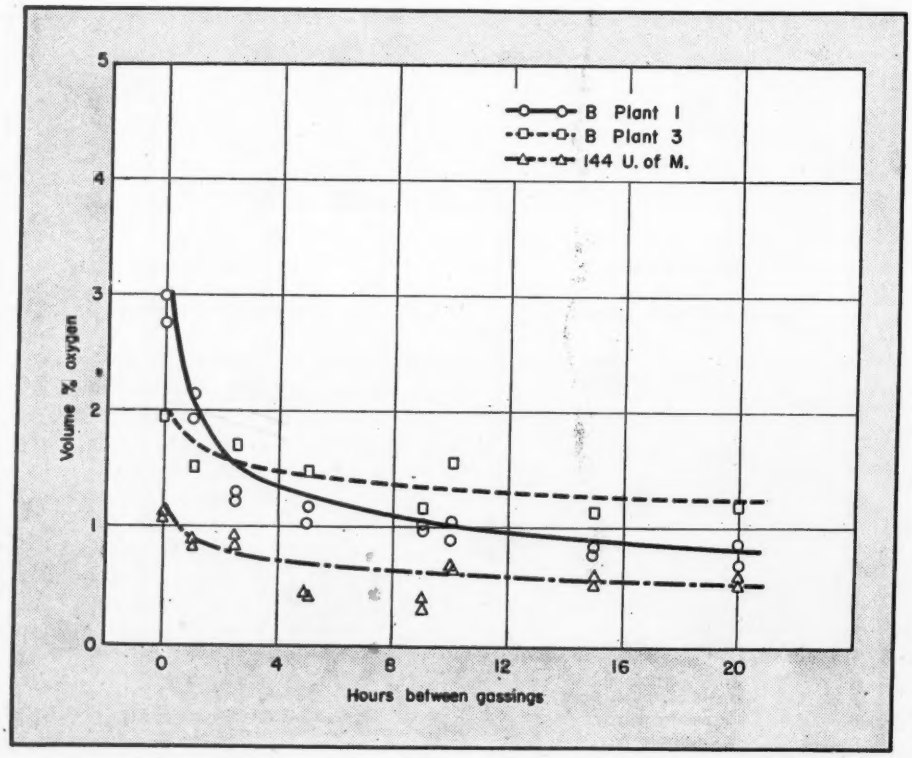


FIG. 4. Relation of equilibrium oxygen level to time between double gassings.

centrated lactose sirup (glass). This lactose glass undoubtedly constitutes the continuous phase of the milk powder particles and is responsible for the resistance of the air cells to internal pressure.

Factors Influencing Entrapment of Air

The amount of air entrapped in the milk powder particle is highly variable and depends in part upon the following known factors:

1. Concentration of the milk sprayed. Gane[2] and Hetrick and Tracy[1] have shown that the amount of air retained in dry whole milk upon gas-packing increases with decrease in the degree of precondensing of the milk.

2. Spraying pressure and size of orifice. Hetrick and Tracy[1] found that high spraying pressure and small nozzle orifice produced powder that retained more oxygen than that secured using lower pressure and a larger orifice. This effect presumably is largely a question of powder particle size.

3. The presence of foam in the milk sprayed. The presence of foam in the milk sprayed may increase greatly the amount of air retained in the powder particles. Deaeration of normal condensed milk before spray-drying does not decrease the amount of air entrapped in the powder. If, however, the condensed milk contains foam, as is true in some drying processes, then deaeration of the condensed milk will decrease greatly the amount of air retained in the powder. These facts are shown quite clearly by the data in Table 1 and the photomicrographs in Fig. 1.

4. Temperature and age of the dry milk at the time of gas-packing. Hetrick and Tracy[1] have reported that dry milk packed from the drier at a temperature of approximately 120 to 125 deg. F. retained less oxygen than dry milk cooled to 60 deg. F. before packing. Aging the powder 18 to 24 hours before packing increased the amount of retained oxygen. These observations have been confirmed in our laboratory and can be explained, at least in part, as follows: The gases entrapped in the powder particles at the time of drying are a mixture of air and water vapor. Since all of the powder particles do not contain air cells, there is no evidence that any of the cells are formed by expanding water vapor alone, but water vapor undoubtedly represents a considerable portion of the gases entrapped. The vapor pres-

sure of water in spray-dried whole milk having a moisture content of 2.5 percent is only about 1.5 mm. The cooling of the entrapped air and the absorption of the excess water vapor will create a partial vacuum within the air cells. The diffusion of air into the cells to equalize the pressure with that of the atmosphere should increase the amount of oxygen retained in powder that is cooled and aged before gas-packing. The 7-day oxygen analyses of cans of dry whole milk gas-packed after aging for 24 hours or longer have been found to be about 20 percent greater than those containing powder gas-packed hot from the drier.

The fact that the oxygen content of the head-space gas in cans of gas-packed powder increases gradually for several days is evidence that the air is not retained indefinitely in the powder particles but slowly diffuses into the head-space gas until equilibrium is attained. The rate of equilibrium for a variety of samples has been studied. The rates for two typical samples are shown in Fig. 2. These data rearranged to show the decrease in the amount of oxygen retained in the powder at different time intervals and plotted on log-log paper are shown in Fig. 3. It is evident from these data that the diffusion occurs at such rates characteristic for each powder, that the logarithm of concentration of the oxygen in the air cell is inversely proportional to the logarithm of time.

Three Ways to Remove Oxygen

The foregoing fact can be employed to advantage to reduce to very low levels the oxygen content of gas-packed powders. This can be done by handling the powder so that most of the oxygen will have diffused from the air cells before final evacuation, gassing and sealing. There are at least three practical means for accomplishing this result:

1. *Multiple gassing* (i.e., gas-packing followed by regassing after a time interval).**

Data secured on double gassing three widely different samples of dry whole milk are shown in Figs. 4 and 5. When double gassing is employed, the equilibrium oxygen level in the free-space gas after the second gassing is a measure of the oxygen concentration that was in the air cells immediately before the second gassing. Consequently, from the results of the study on the rate of equilibra-

**U. S. Patent, 1,786,858 applies to this process.

(*Turn to page* 212)

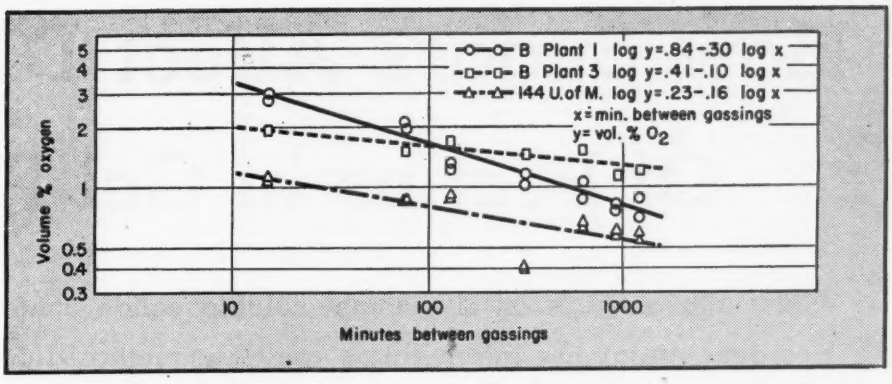

B Plant 1 log y=.84-.30 log x
B Plant 3 log y=.41-.10 log x
144 U.of M. log y=.23-.16 log x
x = min. between gassings
y = vol. % O2
Volume % oxygen
Minutes between gassings

FIG. 5. Relation of equilibrium oxygen level to time between gassings. (Logarithmic scale.) Data for samples from plant 1 and 3 and U. of M.

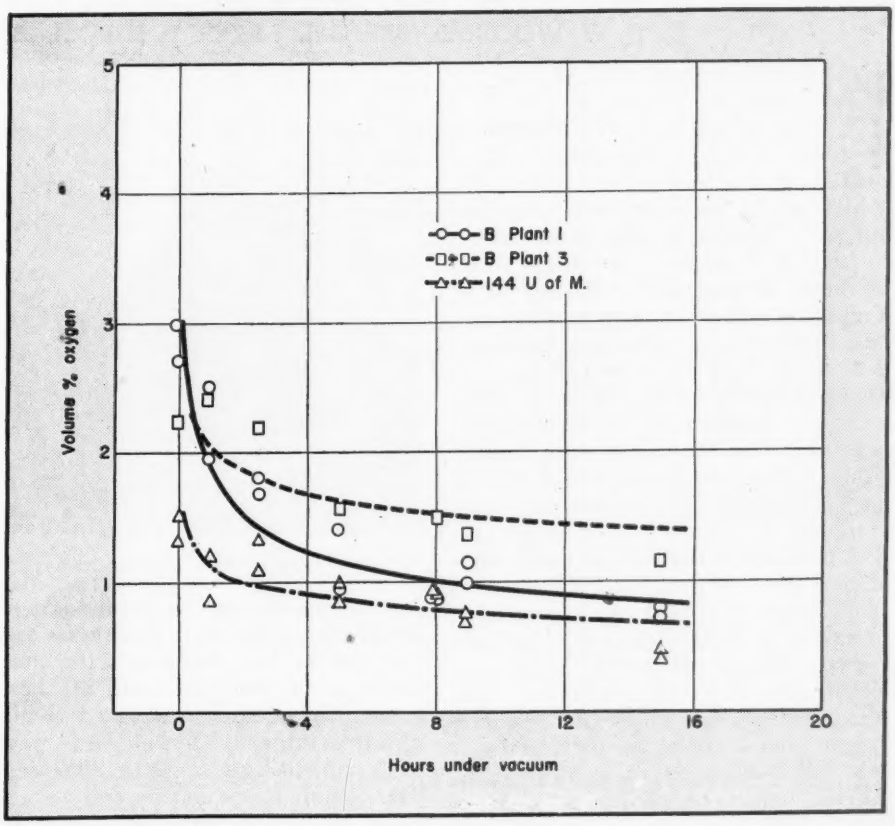


FIG. 6. Relation of equilibrium oxygen level to time held under vacuum before gassing. Data for samples from plant 1 and 3 and U. of M.

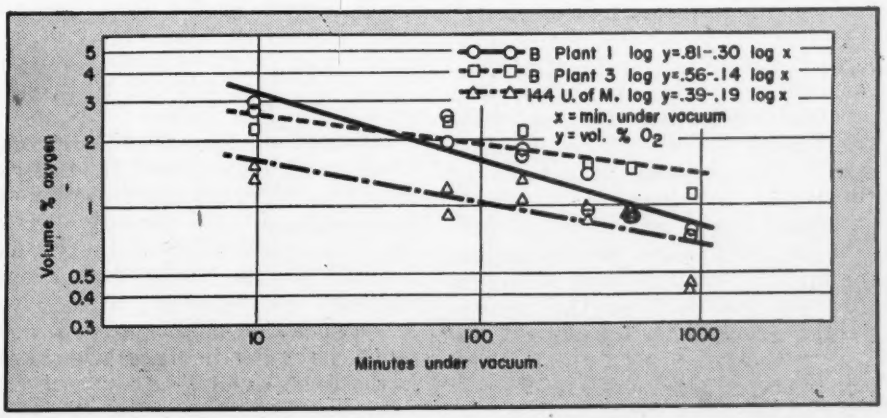

B Plant 1 log y=.81-.30 log x
B Plant 3 log y=.56-.14 log x
144 U.of M. log y=.39-.19 log x
x = min. under vacuum
y = vol. % O2
Volume % oxygen
Minutes under vacuum

Fig. 7. Relation of equilibrium oxygen level to time held under vacuum before gassing. (Logarithmic scale.)

How Sugars Affect Dispersibility Of Pectins in Gel Powders*

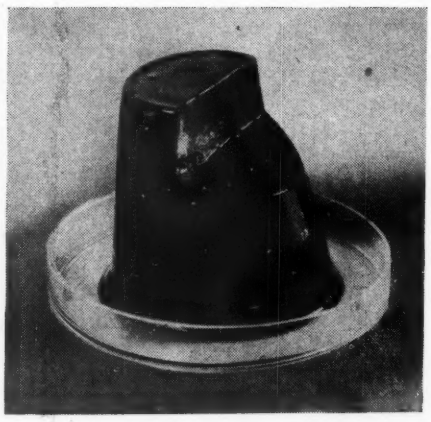
Gels with as high as 60 percent soluble solids content can be produced from powders containing intermediate and low methoxyl pectins. Sucrose and dextrose properly proportioned will regulate gelling quality as well as sweetness of product

By C. W. WOODMANSEE, G. L. BAKER, V. E. POLLARI and W. G. MURRAY

IN THE development of a powdered fruit specialty composed of dehydrated fruit and other materials which might be moistened with water and thereupon, almost instantaneously and without the application of heat, assume the character of a fruit jam[1], it is necessary to study the dispersibility of various types of pectins in the gel powders. Heat was thought necessary to establish some of the fundamentals underlying cold-mixing[1]. These heating experiments yielded data which are considered to be of value to anyone who may contemplate the production of dessert or gel powders designed for hot-water dispersion, cooling, and gelation.

Difficulty has been encountered in the past in dispersing pectin in high concentrations of sugar. For instance, Leo's patent[3] specifies that the "ratio of the finely powdered or granulated sugar to the pectin should not fall below a one to one ratio and should not exceed a fifty to one ratio." Above the latter ratio he found it impossible to dissolve pectin in the presence of sugar or sugar and acid. The present investigations show that Leo's upper ratio can be exceeded if the proper sugar or the proper mixtures of sugars are employed as diluent and sweetening materials. The practical applications discussed here are limited to two sugars, namely, cane sugar (sucrose) and Dyno[5] (dextrose).

A total sugar content of 60 percent in the finished gel represents the highest practical limit of sugars in a gel powder from the volume-weight standpoint[4]. Prepared powders whose sugars are composed entirely of sucrose on one extreme and dextrose on the other or with combinations of varying ratio of these sugars to make up the requirement of a total sugar content of 60 percent in the finished gel, were investigated. The combinations of the two sugars gave rise to a variable range of sweetness for the powdered mixtures. Those composed mainly of dextrose were not very sweet and would be suitable for use as dessert gels. Those composed largely of sucrose would more completely satisfy the sweetness associated with ordinary high-solids jellies.



Jelly of proper texture and consistency.

The type of sugar or the best combination of sugars used in dispersing three different apple pectins—a high-methoxyl (9.8 percent) Pectin No. 1,[6] an intermediate methoxyl (6.5 percent) Pectin No. 2,[7] and a low-methoxyl (4.5 percent) Pectin No. 3,[7]—and a low-methoxyl (4.5 percent) citrus Pectin No. 4[8] are shown in the Figs. 1 and 2.

Figure 1 indicates the effect of sugar or sugar combinations on the dispersibility and gelation of these pectins at pH 3.35±0.15 and Fig. 2 indicates this effect at pH 2.95±0.15. Dispersibility was judged by the ability of the cooked mixture to gel and by its texture. The greater the strength of the gel, the better was the dispersion. The results as shown in the figures represent only one determination for each of the various combinations.

Basic Formula

The following basic formula for the gel powder which gelled upon adding water and boiling for the short period necessary to obtain 60 percent soluble solids, is given for Pectin No. 2:

Pectin	1.0 g. (or parts)
Monobasic calcium phosphate (V-90)[9]	0.1 g.
Citric acid	0.5 g.
Sodium citrate	0,3 g.
Sucrose or dextrose (or combination of two)	90.0 g.

Mix, add 75 ml. of water, and cook to 153 grams or 60 percent soluble solids content. When cooking is complete, pour into standard jelly glass, cover, and allow to gel at room temperature. Partly immerse gels in a water bath at 80 deg. F. for 20 hours before measuring the gel strength.[3]

Lower grade was compensated by increasing the pectin content of the formulas if necessary when other pectins were used. Pectin No. 1 required no calcium for proper gelation.

The amount of citric acid given in the basic formula produced gels of pH 3.35 ± 0.15 with strength as shown in Fig. 1. Additional citric acid (0.8 g.) was necessary to adjust the pH to 2.95 ± 0.15 in order to produce the gels whose strength values are shown in Fig. 2.

*From the Department of Chemistry, Agricultural Experiment Station, University of Delaware, Newark, Del.
Published with the approval of the Director George L. Schuster, Delaware Agricultural Experiment Station, and the Office of the Quartermaster General.

Optimum Ratio of Sucrose and Dextrose

The effect of the ratio of sucrose to dextrose in the various pectin-powder mixes may be noted by the gel strength values shown for the finished gel products. With the exception of the curve for Pectin No. 3 in Fig. 1, it is apparent that either one sugar or the other by itself improved dispersibility of the pectin and consequent jellying ability. Under certain conditions, as indicated by the curve for Pectin No. 4, Fig. 1, and Pectin No. 2, Fig. 2, combinations of sucrose and dextrose were better dispersing agents than either sucrose or dextrose alone. The solubility of dextrose was not necessarily a limiting factor in gelation under the conditions of this study, but it might be if the gel product were held in storage. At lower concentrations of soluble solids this factor becomes negligible or disappears entirely.

From a study of the curves it is apparent that:

1. Dextrose must be used for dispersion of the high-methoxyl pectin in a short-boil procedure and even dextrose did not assure complete dispersion.
2. High-methoxyl pectin dispersed better under the above conditions at a high rather than low pH.
3. Dispersion of intermediate-methoxyl pectin in various sugar concentrations was best in a 70 sucrose-20 dextrose combination at a 90 to 1 sugar-pectin ratio and at a low pH.
4. Intermediate-methoxyl pectin dispersed better at a low pH in a short-boil technique.
5. Low-methoxyl pectins dispersed more readily at a high pH in a high-sucrose ratio, but, at a low pH, a high-dextrose ratio was preferable.

It was found during the study that dextrose tended to act as a slight buffer, that is, increased proportions of this sugar yielded higher pH values. This should not be overlooked in any practical compounding procedure.

The amount of water to be added to a gel powder in a quick-boil procedure must necessarily be restricted, therefore, the conditions of these experiments will be recognized as quite drastic. In order to discover the effect of a longer dispersal period using the above experimental proportions, the gel powder-water relationship was changed from approximately 91 to 75 parts, to 91 to 95 parts. More water lengthened the necessary boiling period before concentration to the desired 60 percent soluble solids. In agreement with theory, the longer boiling period allowed better dispersion of the pectins, and, as a consequence, the gel strengths increased and were consistently about one-third greater. However, the findings with regard to the relative dispersive value of sucrose and dextrose remained approximately the same.

Practical Observations

For practical purposes the amount of sucrose and dextrose in a powdered mixture will depend largely on the desired sweetness and appearance of the gel product. Some undesirable characteristics appeared. For instance, sucrose, alone, produced a grainy texture in the gels in some cases. The pH of the powder-mixes and the type of pectin present also had some influence on the graininess of texture. When this occurred, by slightly increasing the dextrose and with a corresponding decrease in sucrose, the appearance was usually improved. On the other extreme, gel powders intended for making high-solids gels, containing dextrose as the only sugar, upon exposure produced gels which showed surface crystallization in a very short time. Therefore, in order to obtain a good appearance and physical characteristics in the finished gel product, it was desirable to avoid the extremes where the quantity of the total sugar in the powdered-mix was either sucrose or dextrose.

Obviously the dispersion of pectins in gel powders prepared for jellied products of lower soluble solids than the above became progressively less difficult.

It can be, therefore, concluded that the types of sugar and sugar relationships affect the dispersibility of pectins in gel powders.

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1. G. L. Baker, V. E. Pollari and W. G. Murray, Cold-Mix Dehydrated Fruit Spreads. *Fruit Products Journal*, vol. 24, 356, 1945.
2. G. L. Baker, Improved Delaware Jelly Strength Tester. *Fruit Products Journal*, vol. 17, 329, 1938.
3. H. T. Leo, Dry Powdered Jelly Base. U. S. Patent No. 1,646,157, October 18, 1927.
4. V. E. Pollari, W. G. Murray and G. L. Baker, Powdered Gel or Dessert Bases. *Fruit Products Journal*, vol. 24, Sept. 1945.
5. Manufactured by Corn Products Refining Co., Argo, Ill.
6. Pectin No. 1 was obtained from National Fruit Product Co., Winchester, Va.
7. Pectins No. 2 and No. 3 were obtained from General Foods Corp., Fairport, N. Y.
8. Pectin No. 4 was obtained from California Fruit Growers' Exchange, Ontario, Calif.
9. Produced by Victor Chemical Works, Chicago, Ill.

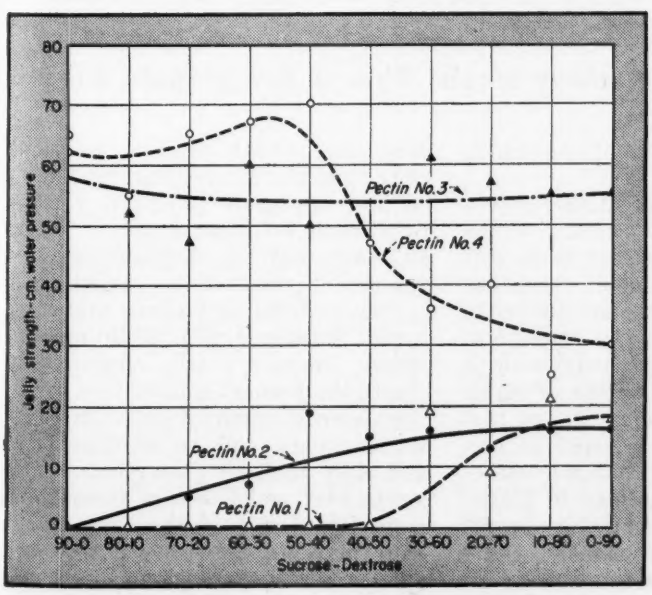

FIG. 1—Jelly strength at pH 3.35 with varying proportions of sucrose and dextrose, and using various types of pectins.

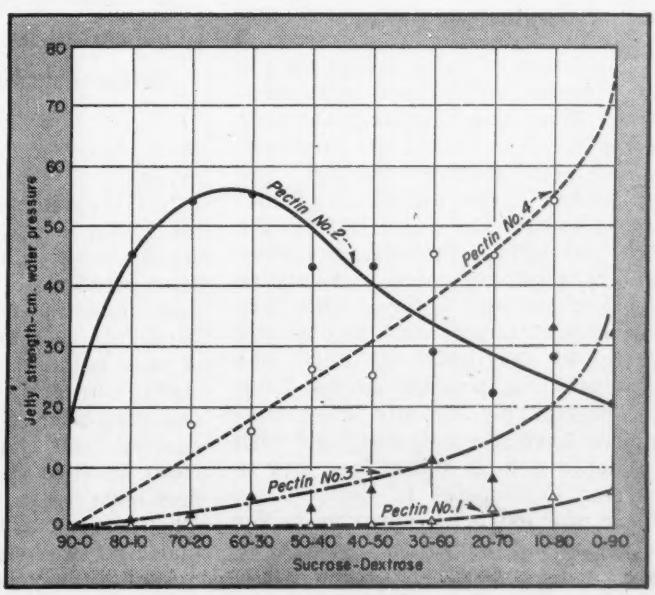

FIG. 2—Jelly strength at pH 2.95 with varying proportions of sucrose and dextrose, and using various types of pectins.

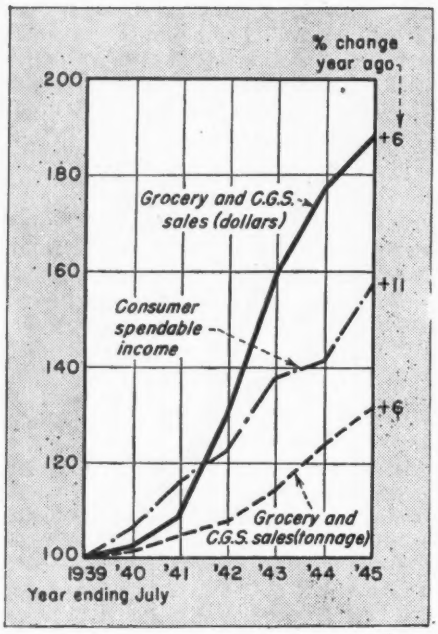

FIG. 1. Consumer 1945 cash income was 135 percent above 1939; real income was up 88 percent; disposable income, 57 percent.

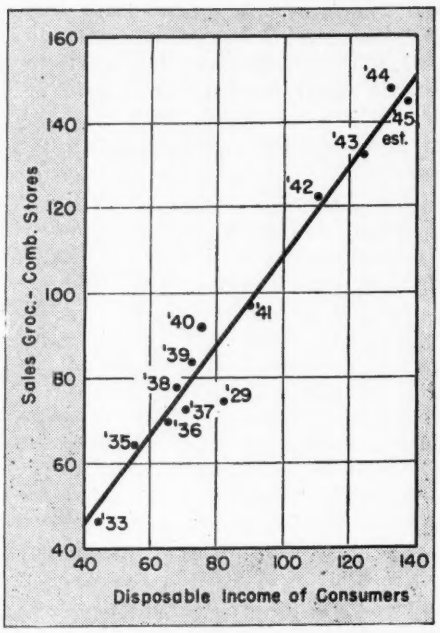

FIG. 2. Sale of grocery and combination grocery store products closely follows the trend of disposable income of consumers.

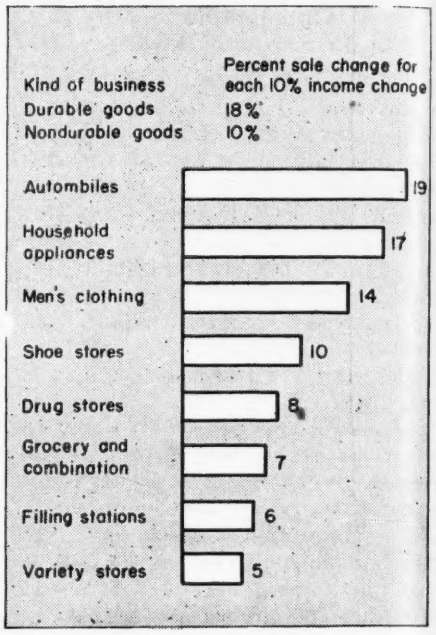

FIG. 3. Sales equivalent of change in consumer income. Food sales do not vary as widely as durable goods sales.

FACTS TO GUIDE POSTWAR DECISIONS

By A. C. NIELSEN, Chicago, Illinois*

The food industry must face the cold, hard fact that from the standpoint of sales resistance, the honeymoon is ending abruptly. A decline of factory sales could mean either loss of consumer sales or adjustment of trade stocks to lower levels. This is the graphic story

THERE is no doubt that the food industry performed some production miracles during the war. For this, their praises have already been sung in many languages—and justly so.

The return of peace brings with it new responsibilities and new problems. Food manufacturers are now in a position to benefit the American public still further, through full utilization of the additional production facilities developed during the war. Throughout the war, consumers bought relatively more high-quality goods than ever before. This was due in part to increased income and partly by the desire to obtain the best products possible among those in short supply. In any event, consumers have demonstrated their wish to improve their bill-of-fare and to correct deficiencies in diet. Thus, there now exists an opportunity for a permanent betterment in the already high standard of American living.

In taking advantage of this opportunity for continued service to the nation, however, there are many difficult problems to be dealt with. The food industry must face the cold, hard fact that from the standpoint of sales resistance, the honeymoon is ending abruptly. Expansion of plants and personnel—the very things that enabled food manufacturers to perform wartime production miracles—now loom up as a spectre to plague all efforts to make satisfactory profits under postwar conditions.

While financial statements list these increased production facilities on the asset side of the ledger, they may, in actual practice, become either assets or liabilities, depending on how aggressively and how skillfully each business proceeds in its efforts to develop satisfactory sales volumes in the postwar period.

These efforts by various manufacturers, combined with declining consumer income, will undoubtedly create the keenest competitive conditions seen for many a year. Marketing strategy will be all-important, and since the best marketing strategy is that which stems from thorough knowledge of the facts about your markets, it is hoped that the data and interpretations presented here will have a direct practical value.

* Condensed from a recent report by Mr. Nielsen to Grocery Manufacturers of America.

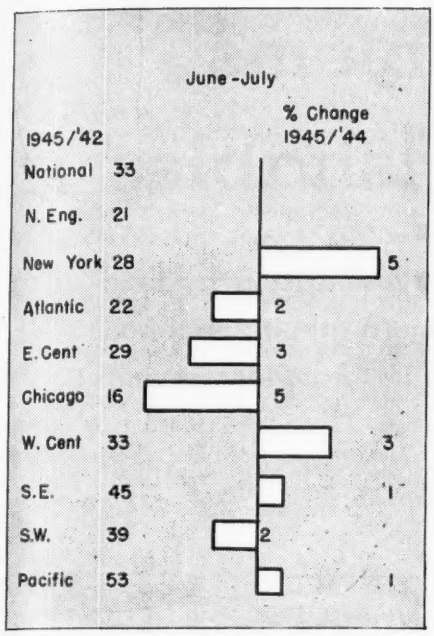

FIG. 4. Changes in dollar sales of all grocery sales: 1945 compared to 1942, reveal important changes.

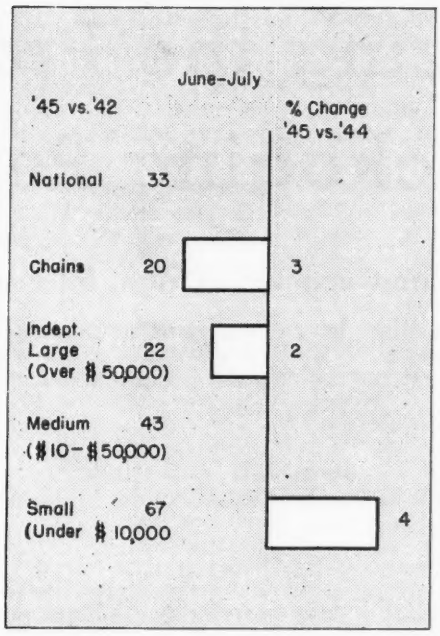

FIG. 5. How small stores, 1945 compared to 1942, made larger percentage gains than larger stores.

The increase of consumers' spendable incomes during the war has been a major factor—probably *the* major factor—affecting food market conditions in the past five years. It explains in large measure the increase of grocery sales in tonnage volumes and the "trading-up" that has taken place in terms of grades, brands and retail outlets. Other factors have included the scarcity of strategic materials, shortages of particular food items, rationed distribution, lack of consumer transportation and difficulties in securing competent personnel, but our interest, in a general analysis such as is presented here, can most usefully be focused on the effects of changes in the purchasing power of consumers.

The graphs presented here will bring out the important elements in the situation with a minimum of comment.

During the war years, consumer cash income rose tremendously (See Fig. 1), and the estimate for 1945 stands at a new high level of about $161,000,000,000. This represents an increase of some 6 percent over last year and a rise of 135 percent above the 1939 level. This rise in consumer purchasing power, of course, occurred during a period when over-all production on durable goods (for civilians) was sharply curtailed. So naturally, sales of nondurable goods rose very sharply and, in most cases, in line with the extent to which they could be made available to consumers.

For the first time during the war, the grocery tonnage in 1945 has kept pace with the dollar sales. This suggests: (*a*) Stability of food price levels during past year, and (*b*) that the process of "trading-up" (i.e., shifting to higher quality brands) has come close to reaching its peak and is leveling off.

Figure 2 shows clearly the relation of retail food sales to the amount of money consumers have available for spending. But Figure 3 shows how small the variation in food sales with changes of consumer income compare, for example, to the durable foods. This elasticity of demand for various types of consumer goods, however, is based on what has happened over a period of years. Whether the correlation will be as close in the year ahead we cannot be sure.

In the transition period, after the end of war production, consumer income will probably fall from its pres-

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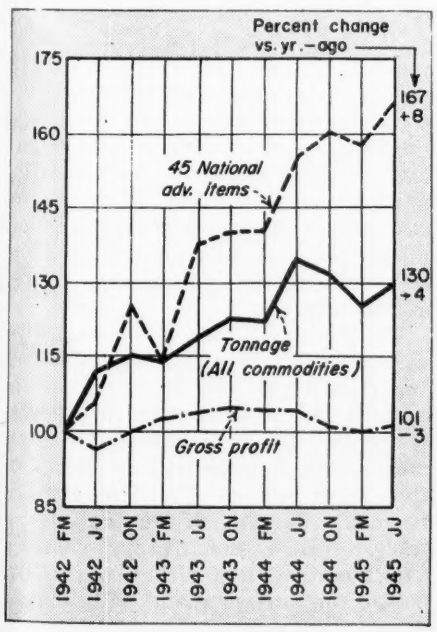


FIG. 6. Tonnage trends and dealer profit on forty-five nationally advertised food items in the whole United States during the war years, between 1942 and 1945.

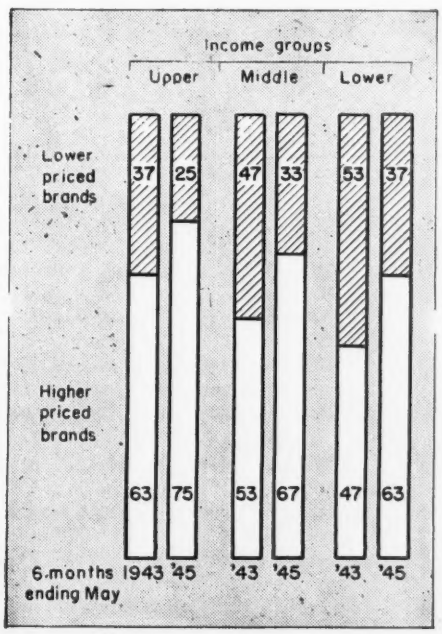


FIG. 7. Low income groups are now buying as large a percentage of higher priced brands as the upper income group bought in 1943. Can these new users be retained?

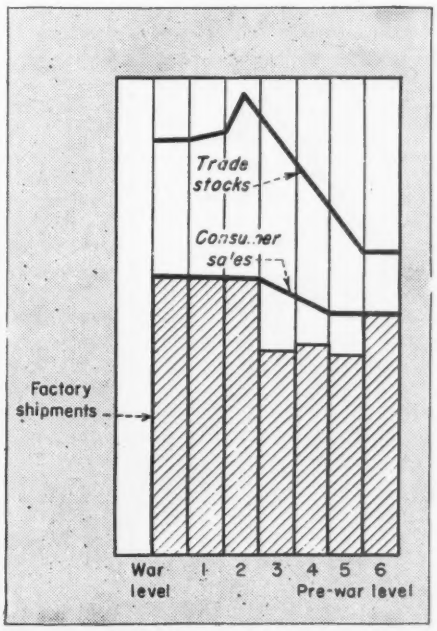


FIG. 8. Factory shipments may decline while dealers are adjusting stocks to lowered post war demand. Such decline calls for correct interpretation.

Analyzing the Problems Of Prepackaging Perishables

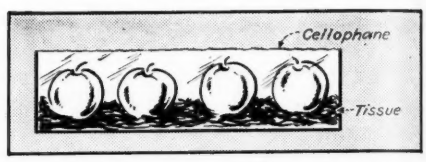
By prepackaging fruits and vegetables right after harvesting and by holding them at a sufficiently low temperature to retard their metabolic processes, a freshness can be delivered unattainable with orthodox methods

By ROBERT E. BAUER,*
Consultant in Package Engineering, Philadelphia, Pa.

FOR several years leading grocery chains have been working on a program designed to improve the condition of perishable fruits and vegetables when they reach the consumer. One approach to the solution of this problem is based on the theory that if vegetables can be prepared immediately after harvesting, packaged and stored under conditions that will prevent moisture losses and retard metabolic processes then, two major objectives will be achieved. One is that a quality of freshness will be delivered that is unattainable with orthodox methods. And secondly, it is believed that the losses due to reduced quality and spoilage will be so decreased as to easily balance the additional cost of preparation, packaging and storing.

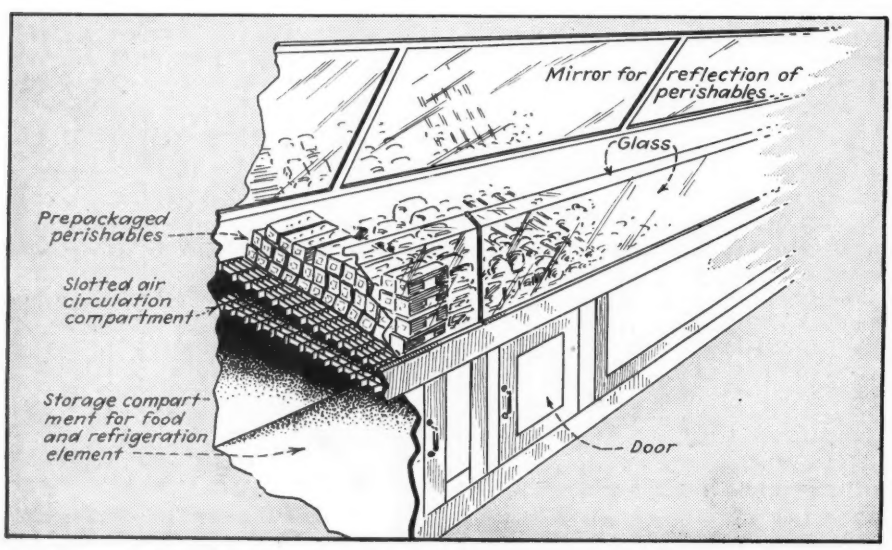
One organization has been working with a large midwestern university, another has established store units, and a trial packaging unit in one of its warehouses near New York City. They are planning to market "prepackaged perishables," fresh fruits and vegetables, packaged on the farm or in central warehouses, and displayed and sold from refrigerated counters or cases, in their stores. According to an official of one of the grocery companies, the program "has not reached the ground floor, but is still in the basement." There are many problems that must be solved before Mrs. Housewife will be benefited.

Many obvious advantages are offered by the prepacking of perishables. The housewife will receive fresher, better flavored and more sanitary fruits and vegetables at very little extra cost, because the grocery companies will spend little extra for prepackaging. There are several reasons for this: Perishables no longer will spoil in a day or two after reaching the grocery counters, but will keep fresh and edible up to fifteen days, because of the sealed moisture-retaining packages and refrigerated cabinets in which the produce is displayed. Due to this expected longer life, it is hoped that waste will be reduced from the usual five percent the chain grocery stores now experience to one-half of one percent. The reduction of waste will save many dollars for the grocery companies and help to pay for the prepackaging and refrigeration equipment necessary. In addition, unit packages of fruits and vegetables kept in self-service refrigerated cases will save from one to two clerks per supermarket, as trimming, bagging, pricing the produce and waiting on customers will be eliminated.



Apples are nested in a carton by placing them on several layers of tissue paper and applying pressure. The paper conforms to the shape of the lower portion of the apples, keeping them separated from one another.

The housewife will be buying harvest-ripened fruits and vegetables of superior flavor and higher vitamin content, not produce ripened enroute to market, for it is anticipated that most prepackaging will be done at the farm where the produce is ripened. Certain fruits and vegetables, such as some pears, peaches and tomatoes, are picked purposely before they are ripe and will be pre-



End view of refrigerator case showing storage space, sloping floor of display compartment, and the method of stacking prepackaged perishables.

*The author has recently returned from military service where he was Packing Control Officer in the India-Burma Theater. Prior to that mission he was in the QMC Subsistence Research and Development Laboratory, Chicago.

packaged before ripened, but these will be the exception. Experience, thus far, has shown that most harvest-ripened fruits and vegetables, prepackaged and refrigerated, will keep in salable condition two to five times longer than perishables handled in the present manner. Judgment in selecting harvest-ripened produce will have to be exercised to insure its arrival at the big markets in edible condition.

The housewife will save time in shopping because prepackaged perishables will be displayed on self-service refrigerated counters or in cases. When she returns to her home, the packaged items can be placed in the refrigerator until time to prepare for cooking. Kitchen drudgery will be lessened considerably, for such vegetables as beets, kale, carrots, broccoli and spinach will be trimmed and washed in mechanical washers before reaching her kitchen. Eventually it is hoped that lima beans and peas will be shelled before packaging.

Fresher fruits and vegetables, in more varieties and greater quantities, will also be available to the customer. Produce, out of season in certain localities, will be prepackaged where it is grown and shipped—either by air, rail or truck—to markets. There can be no doubt that commercial airlines are going to compete with railroads and trucking companies in the shipment of perishables to distant points. Rail and truck shipments of produce are slow and bulky, requiring ice-packing of many items. Speedy, cool airplane deliveries to metropolitan markets will eliminate the dead weight of heavy boxes or crates and ice-packing.

Probably the most important problem confronting the program is that of familiarizing the farmer with the entire project—the prepackaging of his perishables at no extra cost to him. Farmers and farmer cooperatives will have to learn about the advantages of prepackaged perishables and be taught how to package them, using new wrapping machinery and materials. This can be accomplished only by an extensive educational program and by careful supervision.

Refrigeration is important, too! Without refrigerated counters or cases, the entire program will fail. Refrigeration, plus the package, re-

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TABLE I—Length of Time Prepackaged Fruits and Vegetables Keep in Good Salable Condition as Compared With Orthodox Method.

Name	Prepackaged Perishages (Number of Days)	Orthodox Method (Number of Days)
Fruits		
Grapes	10	3
Pears (soft)	10	5
Apples	15	15 to 20
Lemons	15	10
Limes	15	10
Cranberries	15	14
Vegetables		
Mushrooms	1 to 2	1
Yams	2 to 3	2 to 3
Sweet potatoes	2 to 3	4 to 5
Beans	2 to 4	1 to 2
Peas	2 to 4	2 to 3
Lettuce	2 to 4	1
Brussels sprouts	2 to 4	1
Soup greens	4 to 5	3 to 4
Scallions	4 to 5	2
Parsley	4 to 5	2
Water cress	4 to 5	1
Celery	5 to 6	3
Spinach	5 to 6	2
Cauliflower	5 to 6	3
Broccoli	5 to 6	1
Tomatoes	5 to 6	2
Beets	10 to 12	3
Parsnips	10 to 15	7
Carrots (with tops)	10 to 15	3
Onions	13 to 15	15

Close-up view of open-top refrigerator case. Varieties of prepackaged vegetables packaged in several different types of containers are shown.

An open-top refrigerator case containing many varieties of prepackaged perishables. Special features include, vertical glass walls with partial covering, storage space below the display section and mirrors at the rear of the case for sales appeal. The temperature within the case ranges from 40 to 56 deg. F.

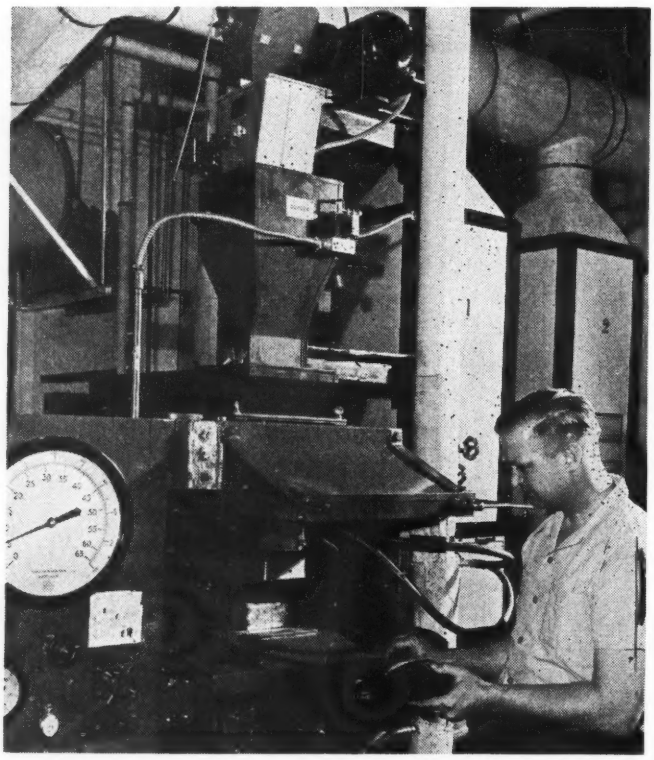
Peacetime Food Compression

Reducing dehydrated foods' bulk by compression not only effects a saving in shipping and storage space but makes possible the economical use of an impervious package. How to avoid breaking up of dehydrated vegetables in compressing is described

By C. A. MAGOON and ASSOCIATES*, Agricultural Research Administration
U. S. Department of Agriculture, Washington, D. C.

THE necessity of sending heavy shipments of foodstuffs overseas to meet military and civilian needs, and the serious losses in ships resulting from the submarine warfare during World War II, made the reduction in bulk of food materials a prime necessity. As a result, food processors and handlers, as well as government agencies, entered upon an intensified program of fruit and vegetable dehydration. Interest was also aroused in the possibility of further reduction in bulk of these foods through compression.

The compression phases of this activity called for the development of new technics. Since experience in this field was too limited to serve as a safe guide, the Agricultural Research Administration of the U. S. Department of Agriculture was charged with the responsibility of conducting research in this field for the federal government. Funds were set up by the Office of Production Research and Development of the War Production Board to initiate the work. While it was not possible under the conditions imposed to bring to satisfactory conclusion the entire program as originally outlined, a considerable volume of experimental data was accumulated and a sound basis was laid for future developments in this field. A Department of Agriculture publication is now in preparation, setting forth in considerable detail the work and findings. Pending its appearance, it has been thought desirable to present in a general discussion some of the lessons derived from these studies for the benefit of those who are looking for guidance in a possible application of compression to food products as a peacetime measure.



A compressed block of sweet potatoes is shown here, ready to be discharged from the food press. The uncompressed food material is weighed and introduced into the press from the mechanism shown above.

Peacetime Compression

It is not possible at this time to say just how profitable compression of dehydrated foods may eventually prove to be, but there are situations and conditions where it would be of decided advantage. At the outset, the prime objective of compression was reduction in bulk in order to save in shipping and storage space, and this still is a prime consideration. Satisfactory warehouse space for the storage of foods is likely to be expensive, often it is inadequate, and in some cases scarcely available. Wherever compression is feasible, reduction in warehousing costs are possible and compactly packaged units make for ease and economy in handling.

An impervious package can also be provided more readily and cheaply for a high-density product than for a bulky one.

Under some conditions compression of foods would reduce transportation costs. With the normally packed dehydrated products the bulk is so great that a standard railroad car will not hold a minimum carload and a ship cannot be loaded to the standard storage factor of 40 cubic feet per ton.

Compressed foods would be particularly advantageous where high temperatures prevail and refrigeration facilities are limited, as in tropical or semitropical regions and on ships. They would also be particularly adapted to use in logging, mining or other camps far removed from ready sources of food supplies and their compact form would facilitate their transportation in unsettled regions.

Reduction in bulk, however, is but one of the important considerations in the production of satisfactory compressed foods. Their future as peacetime standard commodities will depend on how they are received by the ultimate consumer. All food handlers know that purchasers of foods are "choosy" and must be satisfied if continuous patronage is to follow. For compressed, dehydrated foods to succeed, they must:

*The helpful comments of Louise Stanley, W. B. Van Arsdel, J. E. Harmond, R. C. Wright, E. W. Toepfer, Esther L. Bachelder, Elsie H. Dawson, and C. C. Fifield of this Administration are gratefully acknowledged.

1. Be palatable when reconstituted.
2. Be nutritious.
3. Have eye, as well as taste, appeal.
4. Be easy to prepare.
5. Maintain their desirable properties for a reasonable length of time under ordinary storage conditions.
6. Be available in units adapted to the needs of the individual family.
7. Be reasonable in price.

If these conditions can be realized, the market for compressed dehydrated foods will be assured.

Consumer Acceptance

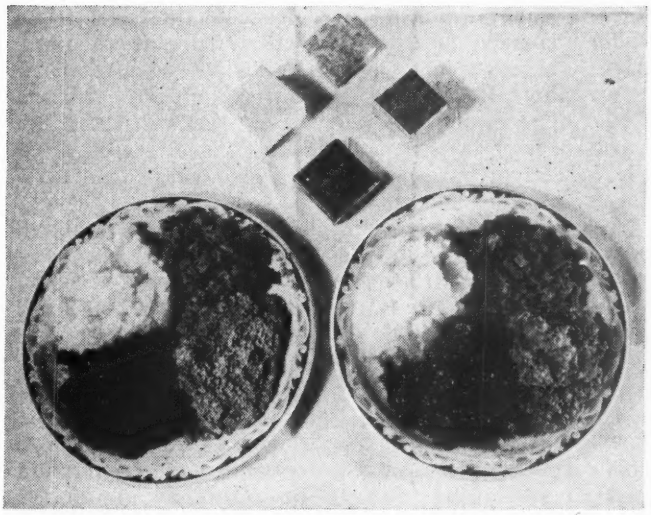
The factor that more than anything else will determine consumer acceptance is palatability. The dehydrated foods of today, taken as a whole, are far superior in this respect to those of World War I, but with some products, we still have a long way to go in making them really appetizing. With few exceptions, reconstituted dehydrated foods do not taste like foods prepared from fresh produce, and it is unlikely that many of them ever will. That does not mean that they may not come to be enjoyed, and even preferred to many foods prepared from the so-called fresh produce of the corner grocery. Food prepared from the manufactured, dehydrated product must have color, flavor, texture and acceptability which are commensurate with good palatability. If it has these, the public will buy it and come back for more; if it doesn't, it won't sell no matter how nutritious it is, how good it looks or how attractively it is packaged.

It is not the purpose of this article to tell how to produce high-quality dehydrated foods—that has been and is being done, as more information is accumulated, by specialists in that field. The point we wish to make here is that foods to be compressed must be of high-table quality. Our experience has been that compression does not materially affect the quality of the product either for better or for worse, provided the compression is properly done. It may seriously injure the quality of the product if improperly done. The nature of the injury will differ in type and degree with the different kinds of dehydrated foods.

Overcoming Vegetable Breakage

Considering vegetables as a group, those that are low in moisture content and low in natural sugars are very brittle. Subjecting them to compression results in breakage or fragmentation of the pieces causing a greater or less amount of so-called "fines." With some products this is a really serious matter. Take dehydrated white potatoes, for instance. When the pieces are broken or crushed, free starch is released from the fractured starch cells, and when such potato products are reconstituted and cooked, this starch swells into a paste which makes the whole mass gummy and unpalatable. Cabbage is another product in which large amounts of fines are highly objectionable.

One of the problems of the processor in applying compression to brittle products is how best to overcome this brittleness prior to placing in the press. Two means offer promise: One, by raising the temperature of the product to the degree that it loses its brittleness temporarily and may be compressed without fracturing; and the other, by pressing the product while it has a moisture content high enough to prevent breakage of the pieces. Both processes have their limitations and must be used with great care. If too high temperatures are used, injury to appearance and flavor results,



These two heaping plates of mashed potatoes, carrots, meat loaf and cranberries—starting at upper left and reading clockwise around the dish—came from the four small cellophane-wrapped squares of compressed dehydrated food, arranged above in the same order.

and too high moisture content results in poor keeping quality unless the blocks are thoroughly dried before packaging. Each type of product has to be considered by itself and the preliminary treatment given must suit the needs of that particular product. The research carried on to date has determined what the best preliminary treatments are for many kinds of dehydrated foods, but in the case of dehydrated white potatoes and some other products, satisfactory methods of pretreatment have not yet been developed.

• With food products such as powdered soup mixtures, cereals and soy flours and powdered eggs, the matter of fragmentation, of course, is not a problem, but the temperatures used, the moisture content, the degree of pressure applied and the methods of application of pressure are very important matters.

A degree of pressure that will make possible coherent blocks that may be handled readily is a practical necessity, but there is a point beyond which it is not profitable to go, both from the standpoint of practical economics and the quality of the product. For most foods, pressure quickly applied and quickly released results in blocks lacking in coherence. Equal or even less pressure, more gradually applied, and maintained for a few seconds after the peak is reached (known as "dwell") has proved much more satisfactory. There is always a certain amount of re-expansion of the block when the pressure is released, and in some cases, cooling in a simple holding press for a short time before wrapping has been found to prevent excessive re-expansion.

Effect on Quality

It is not possible on the basis of the present limited experiments to say to what extent compression may influence vitamin retention in dehydrated foods. It was at first hoped that through the reduction of the amount of air present in the food package further vitamin losses might be prevented, but little evidence has been obtained so far to indicate that this is the case. It was observed in such work, as it was possible to do in this field, that loss in vitamin B_1 paralleled closely the deterioration in the flavor of the product under storage at different temperatures. In most cases, as mentioned earlier, compression *per se* did not appear to have any

effect on flavor when properly done. In the case of one product, namely, cheese-soya soup mixture, the keeping quality appeared somewhat improved by compression.

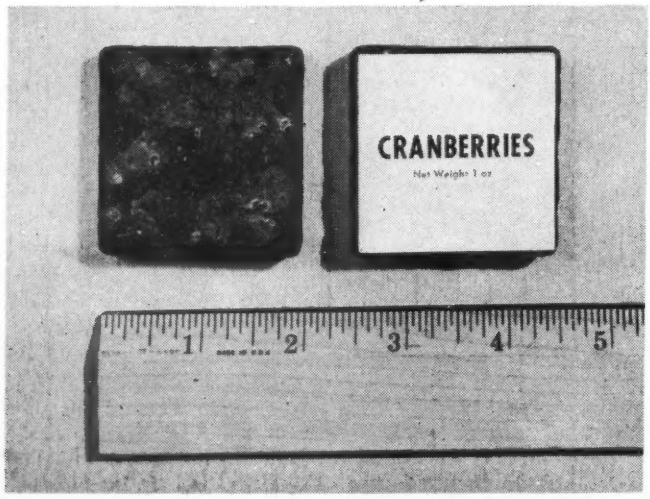
To retain full nutritive properties, complete exclusion of the oxygen of the air from contact with the dehydrated food is necessary. This calls for something more effective than mere compression. Much more research is needed in this field.

From the standpoint of eye appeal, properly prepared high-quality foods, compressed into suitable sized units, can be very attractive. From the standpoint of being able to see what is within, transparent wrappers, of course, make the strongest appeal, but in the use of these caution must be observed. Some of them really give but little protection to the food, not merely because they may lack in physical strength, but because they are not sufficiently impervious to the entrance of moisture and allow access of oxygen to the foods. This class of packaging material is constantly being improved in these respects, but the packer should satisfy himself on these points before making use of any particular type of wrapper.

One other thing that needs to be kept in mind is that light has a deleterious effect on dehydrated foods; those having the natural green color gradually losing it when exposed to light and some attractive products turning brown or otherwise deteriorating under the same conditions. To retain the natural colors as much as possible, opaque wrappers are probably best, though it may be that transparent wrappers capable of excluding the harmful light rays will be developed. Whatever the material used it must afford physical protection and at the same time be highly impervious to moisture and the passage of gases.

The food handler has long been aware of the sales value of good and attractive packaging, and the necessity for it in the merchandising of compressed dehydrated foods cannot be overlooked, but eye appeal must exist inside the package as well as on the outside. Of the two, the appearance of the food product within the package is of greater importance.

There is a vast amount of sales resistance to be overcome before compressed dehydrated foods will take their rightful place beside our standard fresh, canned, and frozen foods. This sales resistance can and will be overcome when attractive looking and good-tasting products are offered.



Each of these packages of compressed dehydrated cranberries contains enough fruit to serve four persons.

Suitable Densities

One of the strong arguments in favor of compressed dehydrated foods is the convenience which they offer to the housewife. It needs to be stressed, however, that ease in preparation of these foods in the kitchen can be very effectively lost through the use of excessive pressures during the formation of the block. The press operator, therefore, must be very careful in his control of pressures. To reconstitute or restore satisfactorily, it must be possible for the food block to disintegrate readily when put into water and this cannot take place if the block is too dense. The degree of density which a food block may have and still reconstitute satisfactorily varies with different products. A density satisfactory to one may be entirely too great for another. Present investigations were concerned in part with these matters and the most suitable densities determined for a considerable number of fruit, vegetable and cereal products.

Along with this matter of density must also be considered that of the size and shape of the compressed food unit, since larger and thicker units require more time for the block to disintegrate during reconstitution.

While the packer has no direct control over the manner in which his products may be handled in the kitchen, he can, by furnishing proper directions along with the package, do much to make his product appreciated. There are methods more favorable than others for a reconstitution of compressed foods and the housewives should be guided in this. Here again, the present investigations included experiments to determine best methods for various products.

In the early days of dehydration, it was easy to find published statements to the effect that all that was necessary was to store the dehydrated product in a dry place and it would keep for a very long time without change. We now know that this "just isn't so." Drying delays, but does not prevent deterioration. Everything deteriorates, however, even our so-called fresh foods, when they appear to be sound. By canning under controlled conditions, it is possible to delay certain kinds of deterioration and by dehydration we accomplish much the same, but there is a limit to the time during which any of these products can be stored.

Assuming that the compressed food has been properly prepared, there are four factors that affect its storage life, namely, moisture content of the product, temperature of storage, the relative humidity of the storage atmosphere, and the presence of air. It has already been pointed out that in order to make satisfactory compressed blocks, a certain amount of moisture must be present to give coherence, but once the block has been formed, the lower the moisture content to which the food can be brought, the longer its storage life will be. Fortunately, the development of the in-package desiccation ideas has opened up fine possibilities in this direction.

Experimental evidence shows that the higher the storage temperature, the more rapid the deterioration in dehydrated foods, and compression does not prevent it. The lower the moisture content, however, the longer the food will keep even at the higher temperatures. Further, the more effectively the air is displaced in the container by an inert gas, the longer the food will keep. It looks as though the most promising and practical way to handle compressed foods in the storage warehouse is to seal them in air-tight metal containers

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EDITORIALS

LAURENCE V. BURTON, Editor

Possible Effects of Food Crisis

HERE is a quick appraisal of the problems to be faced in 1946 arising out of the world food crisis and America's decision to share its food with the hungry abroad.

Dehydrated Vegetables

The food crisis in Europe may mean a new outlet for dehydrated vegetables, especially potatoes. But it is unwise to count on the possibility without firm orders, for food habits of European urban dwellers differ from ours.

Livestock

Unwise price control policies have made it more profitable for farmers to feed their wheat to livestock than to sell the grain. Calling the government loans on wheat to force the grain into the market is a futile gesture. Farmers will refinance their crop loans as they did earlier in the war.

If 225,000,000 bu. (6,000,000 tons) of wheat are exported, this country will be virtually out of wheat in five months unless something is done to reduce domestic consumption. A likely plan is to raise ceiling prices on cash corn from $1.18½, Chicago, to about $1.40 to bring corn to market and make it available for processors and feed manufacturers, instead of wheat. That, or else to lower live hog prices so that it would be less profitable to feed them. Whichever is done will bring much livestock to slaughter and temporarily increase meat and poultry supplies. It will also reduce the number of animals on the ranges to more desirable figures. Many observers believe we are endangering the ranges by grazing too many animals.

Flour and Milk Production

Increasing extraction of flour from 68 to 72 percent to 80 percent, as proposed by President Truman, may produce more flour of a sort, but it will reduce equally the quantity of by-product feeds. This will offset the other conservation methods and will probably have its greatest effect on milk production. Nine percent less by-product feeds will not increase the milk flow when it is desperately needed for cheese and butter, and fluid and evaporated milk.

Brewing

Complete stoppage of the use of wheat for production of alcohol and beer will impose a burden on brewers, particularly in view of the world shortage of rice and the apparent tightness of corn. For, use of other grains by brewers is also limited to the amounts used in 1940—about 30 percent less than 1945 consumption.

Macaroni

Macaroni products made from durum wheat—not suited for bread—will be darker and full of bran specks. Dismayed manufacturers hint withdrawing branded goods from the trade.

Meat and Lard

Meat packers face deferred problems. The first effects of the wheat conservation orders will be increased marketings of live stock, followed by reduced marketings. The pork set-aside order calls for 10 percent of the live weight of hogs slaughtered. Lard set-aside is increased from 3½ to 5 percent of live weight of hogs. With the expected lighter weight hogs, lard production per hog will decline. Yet, President Truman expects us to export 375,000 tons of fats and oils in 1946, 1,000,000,000 lb. of meat in the first half of the year and 600,000,000 lb. in the second half. This shows the calculated trend in livestock marketings.

Vegetable Oils

With the expected decline in lard production and huge exports of fats and oils, it is foreseeable that vegetable oils will be scarcer for some time, despite efforts to get the copra industry going in the Philippines. If it does succeed, however, the oil shortage will be somewhat relieved by the coconut oil.

Baking Industry

Bread bakers, accustomed to using strong wheat flours, are aware of the darker bread that is ahead. They face fewer problems than biscuit, cake and cracker bakers without experience in use of long extraction soft wheat flour. Opinion is that added shortening and sugar would ease many problems except darkness and specks. But, where are they to be had?

Canning and Freezing

Writing so soon after President Truman's pronouncement makes it impossible to ascertain the revised 1946 plans of the food preservation industry. But, it seems clear that the days to come will place an excessive demand on all forms of fruit and vegetable processing. If America is to export its wheat, meat, fats and milk products in larger amounts, the population must subsist to a larger extent on fruits and vegetables. This makes it look like a hey-day for canners and freezers for another year.

Molasses

Sugar was not mentioned by Mr. Truman, but a sounder handling of price controls to encourage large imports of molasses will have a considerable bearing on the cattle feed and yeast situation as well as alcohol production. Any inept handling may, however, result in amateurish tropical production

of low-grade rums rather than importations of an important ingredient of cattle feeds.

Fishing

The one branch of the industry that stands to benefit more than any other is the fishing industry. Though short of beam trawlers and now on strike, it appears as if anything that will float could be put into service and be highly profitable during the last half of 1946.

Hope for Good Weather

All of the foregoing analyses are predicted on average weather in the 1946 crop growing season. If unfavorable weather—be it drought, hail or cold and wet—should curtail crop production, the lean austerity days will come.

Results of the "MAY HAVE" Clause

OUTSTANDING theme at the recent convention of the National Canners Association, National Preservers Association and others at Atlantic City, N. J., was emphasis on sanitation and better cleaning of equipment. Most of the discussions originated with the manufacturers themselves or the technologists of their respective associations. They were supplemented by a speaker from Food and Drug Administration who "rattled the saber" for the benefit of any who doubted the intention of FDA to enforce the food law.

The "MAY HAVE" clause of the Food, Drug and Cosmetic Act received plenty of advertising. In case there are any who are not aware of the "MAY HAVE" clause, it is quoted here.

"Sec. 402. A food shall be deemed to be adulterated—(a) (4) if it has been prepared, packed, or held under insanitary conditions whereby it MAY HAVE become contaminated with filth, or whereby it MAY HAVE been rendered injurious to health."

Under the previous law, in order to convict, it was necessary to prove the presence of filthy, putrid or decomposed material in a food; but, under the present federal law, it is only necessary to prove that the conditions were such that the food MAY HAVE been contaminated or rendered injurious to health. This puts it squarely up to the manufacturer to keep the whole premises and all equipment in a spotlessly clean and sanitiary condition whether the food actually comes in cantact with it or not.

Even if there were no stringent food law, there are technological reasons aplenty to impel the food manufacturer to maintain a high degree of sanitation in his plant, particularly where he is sterilizing foods by heat. Many of these reasons were discussed at the technical sessions of the National Canners Association. Some measure of the importance of the subject may be gained from the fact that two times it was necessary to move the meetings into successively larger rooms. It was the technological reasons for sanitation rather than fear of law violation which brought the astonishingly large attendance.

A gratifying parallelism to the recognition for the need of better sanitation—especially against invisible bacterial growth—was the exhibition of several pieces of new equipment in the machinery hall. In these, the idea of better sanitation was incorporated by designing them so that the interior works could be pulled out easily for thorough cleaning. While most canning equipment has not yet achieved the advanced design for cleanability to be found in dairy equipment, the improvement that has taken place since prewar days is highly commendable.

Inasmuch as freezers and dehydrators, as well as canners, use identical preparation equipment, especially for vegetables, the improvements in design and construction will be equally beneficial to all three. It would seem logical for equipment builders to hasten the day of ideal sanitation by closer liaison with the food control officials. And, conversely, it would seem equally logical for the FDA to employ a properly trained design engineer to render this aid to machine builders whose knowledge of food technology is inadequate for rapid compliance with the needs of the day.

It is inevitable that the combined forces of technological necessity and law enforcement will compel a very considerable replacement of old designs, whether they are of prewar vintage or not.

Pessimists Foresaw Food Crisis

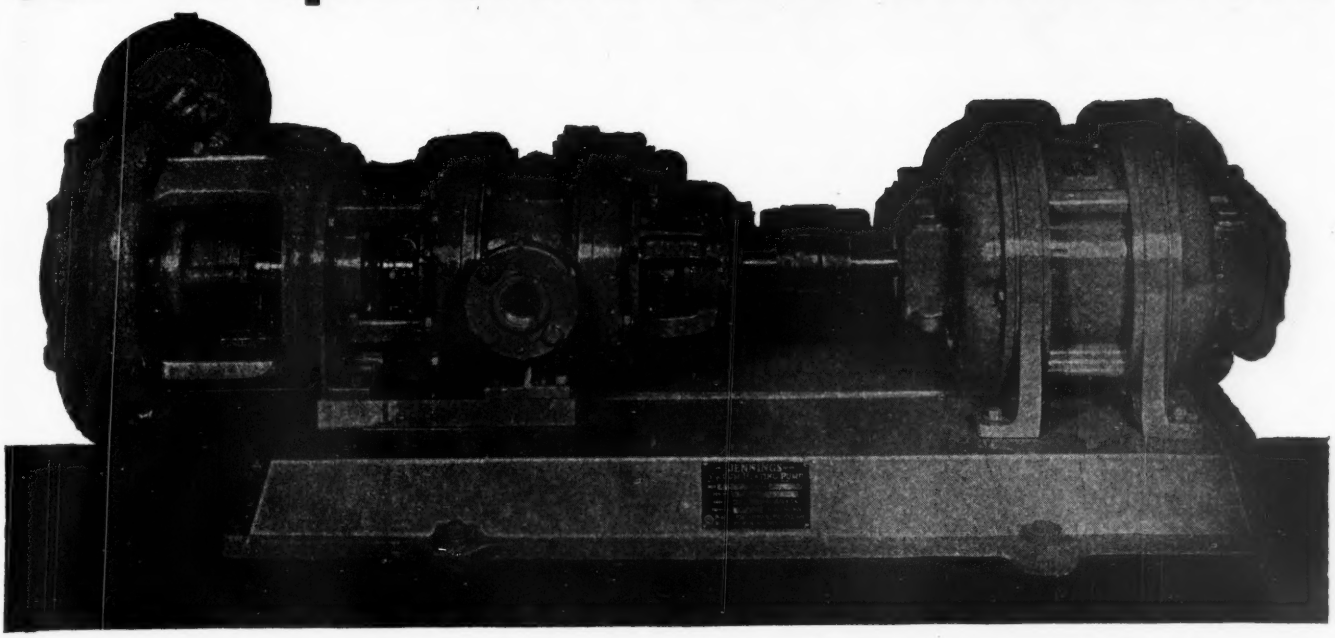
SOME two or three years ago, before UNRRA was formed, there was in Washington an organization known as OFRRO (Office of Foreign Relief and Rehabilitation Operations). It seethed with squabbles and discontent when the backers of two conflicting policies clashed. "Washington jitters" were never worse than in OFRRO.

Those clashes are now worth recalling because one group wanted to stockpile food for postwar relief while supplies were in ample quantity. The pessimists had calculated that 25,000,000 tons of food would be needed, during the first year after hostilities ceased, to give 1,600 calories daily to Europe. They had canvassed the entire world resources and had concluded that it was not likely to be available, so they urged immediate stockpiling.

One of the pessimists was an experienced market research man whose findings should not have been taken lightly. But he was no politician. He talked facts and figures—not glib assurances. He was so convinced of the merit of his lengthy investigation that he precipitated a showdown but was ousted, along with all who shared his views.

In the light of the world food crisis, so recently proclaimed in London and Washington, it is obvious the pessimists were more nearly right than the optimists. It is a pity that food was not stockpiled against the foreseeable emergency. Pessimists are not always wrong.

Nash—the Perfected Vacuum Pump for Evaporators and Condensers

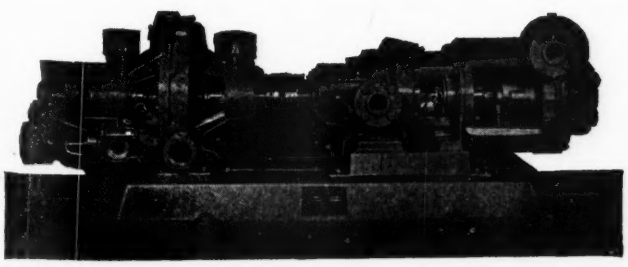


COMBINATION VACUUM REMOVAL UNIT ESPECIALLY DESIGNED FOR SATISFACTORY OPERATION ON CONDENSERS WITHOUT BAROMETRIC LEG

Especially designed for drawing air and liquid from high vacuums, the Nash Vacuum Removal Unit is an efficient combination of a standard Nash Vacuum Pump and a Jennings Centrifugal. This design may be had in either motor or steam turbine drive, and may be installed with confidence that it will operate perfectly.

Nash Vacuum Pumps for Evaporator and Condenser Service offer unusual advantages. Vacuum is non-pulsating, producing uniform operating conditions and assuring a better product. Nash Vacuum Pumps have no valves, gears, pistons, rings, or mechanical complications. The single moving element rotates without metallic contact, and no internal lubrication is required. In standard design these pumps maintain vacuums up to 27" of mercury.

Nash Pumps are compact, and require but a fraction of the space taken by old type equipment. They may be installed where convenient, and they operate at suitable speeds for direct connection to either electric motors or steam turbines. Nash engineers will be glad to recommend proper equipment to exactly meet your particular requirements.



THE NASH VACUUM REMOVAL UNIT MAY BE HAD EQUIPPED WITH STEAM TURBINE DRIVE WHERE THIS TYPE IS PREFERRED

NASH ENGINEERING COMPANY

SOUTH NORWALK • CONNECTICUT, U. S. A.

NEW PACKAGES & PRODUCTS

They Compliment Meats

AS Christmas gifts to its customers, The Griffith Laboratories, Chicago, packaged four sauces in bottles with redesigned labels. Demand has resulted in a decision to sell these through regular food channels.

The manufacturer says that the Steak Sauce and Worcestershire Sauce have been aged for more than six months before bottling. The Chop Suey Sauce is the unadulterated liquor of hydrolized corn and wheat glutin. Griffith's Barbecue Sauce is made from a formula that starts with 110 parts tomato product, spices and flavors. It is cooked down until 10 percent or more moisture is removed, leaving a tomato paste.

The 6-fl. oz. bottles are attractively labeled in blue, green and red with appropriate motifs for each sauce.

Honey Centers

THE sugar shortage is not the chief concern of Cuban Honey, Inc., Lansing, Mich. The company has been importing El Aquinaldo Honey from Cuba since 1933 and the newest product utilizing this sweetening agent is a group of dipped chocolates called Bittersweets.

Seven flavors of cream fillings are coated with bittersweet chocolate and packaged in standard 1 lb. candy boxes.

Besides the honey, ingredients include corn sirup, sugar, egg whites, tapioca, flour, chocolate, true and artificial fruit flavors. Use of the honey results in exceptionally smooth, fine-textured centers.

Canned Oatmeal

OATMEAL PORRIDGE that is ready to heat and serve is distributed by B. Altman and Co., New York.

Marked for the "Busy Woman," the scotch-style porridge has been cooked the equivalent of 12 hours in an exclusive steam process. After the tin is opened, it will keep in a cool place for two or three days.

The cream-colored cereal has a smooth texture and slightly gelatinous consistency. A No. 2 can holds 1 lb. and makes four servings.

Appetizing

BONED CHICKEN is first of a line of chicken products being introduced to the civilian market by Chicago Western Corp., Chicago.

Containing chicken, chicken broth and salt, it has been prepared by a new process which retains the true flavor and is suitable for use in salads, sandwiches and hot dishes.

The 6½ oz. can is labeled in red and yellow and bears the certification of the U. S. Dept. of Agriculture.

FOOD INDUSTRY NEWS

GENERAL

President's New Food Program Hits Meat Packers and Millers

Higher wheat extraction means less feed, thus bringing important changes in the meat program through the year

RECOGNITION of the world food shortage is here at last. During the first week in February, President Truman asked the people to embark upon a grain conservation program, which would permit shipment during the first half of the year of 6,000,000 tons of wheat and 1,000,000,000 lb. of meat to areas throughout the world where the scarcity of food threatens millions with starvation. The plans also called for the export of 375,000 tons of fats and oils and an additional 600,000,000 lb. of meat by the end of 1946.

Besides the obvious conservation measures the President's program reverses the Department of Agriculture policy on feeding hogs to uneconomic heavy weights and deals with distribution problems in two areas. One is the faltering railroad system in this country, the other is the dearth of shipping facilities on and between the copra producing islands of the western Pacific.

The revised wheat shipping program will cut domestic stocks to 150,000,000 bu. by July, 1946. This is the smallest carry-over since 1938 and one of the smallest on record. Most of the wheat stocks now remaining in this country are in the areas that produce the wheat, a lot of it still on the farms. Department of Agriculture officials say this results from a box car shortage. Secretary Anderson further explains that there are "a thousand plugged elevators in the Northwest." BAE figures show nearly 100,000,000 bu. more wheat still in the hands of the farmers of the seven major producing states, on January 1, of this year, than the 1935-1944 average.

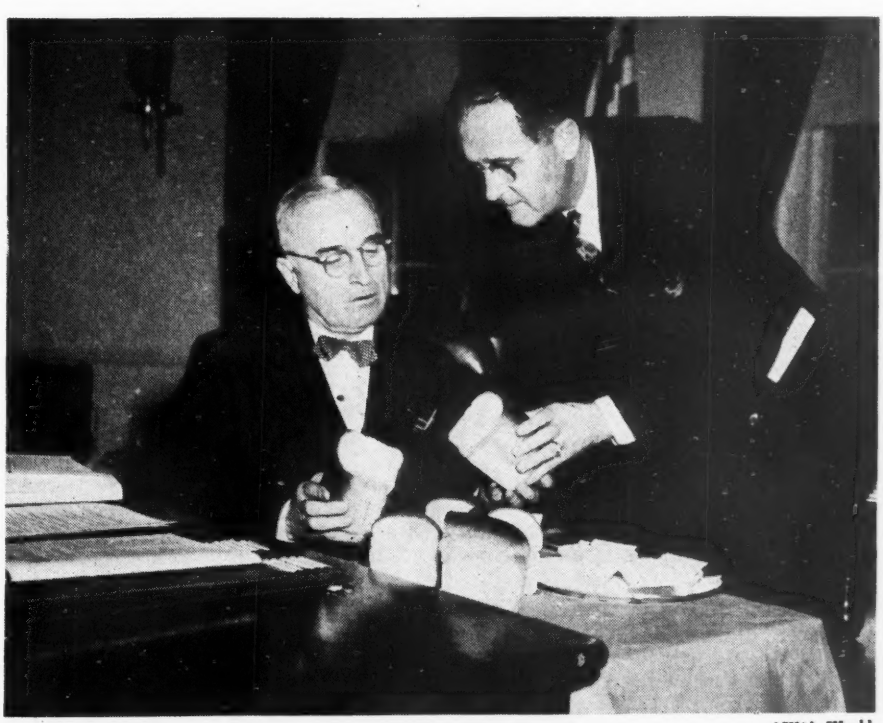
USDA officials say the rapid disappearance of wheat in the fourth quarter of 1945 brought on the present crisis. Figures compiled after the end of the year show a wheat disappearance in the fourth quarter of 1945 of 341,000,000 bu., compared with a fourth quarter disappearance of 254,000,000 bu. in 1944, a 34 percent rise. The 1934-38 average fourth quarter disappearance was only 179,000,000 bu. The disappearance of corn and oats during the last quarter of 1945 was 7½ and 35 percent greater, respectively, than for the same period in 1944.

By lifting of the floor extraction ratio from 72 percent to 80 percent, the supply of wheat flour from a given amount of wheat is increased by 11 percent. But the amount of mill feed that is produced is decreased by almost 30 percent. This will cut animal feed supplies, which is an added incentive to market hogs and cattle, that must be slaughtered promptly if the relief program is carried out on schedule.

In asking for the early marketing of hogs Secretary Anderson said that the government is bound by three commitments: (1) to maintain the price of corn, (2) to hold the ceilings on hogs and (3) to prevent world starvation. If any of these commitments must be broken, it will be the ceiling price on hogs weighing over 225 lb. Secretary Anderson told a press conference that if the farmer cannot be persuaded to follow the program, it is probable that the ceiling on hogs over 225 lb. would be cut and the ceiling on hogs weighing under 225 lb. raised. "In this case," said the Secretary, "farmers would be given ample time to get out from under."

One of the first official moves, after the President's program was announced, was to reinstate the set-aside order for pork and to extend the set-aside for lard to help meet foreign commitments.

The official forecast of the meat situation is that even though government action induces an early liquidation of excess and overweight hogs, cattle and poultry, no meat rationing will result later from the drain on supplies. Some meat will be held in storage for consumption when supplies drop. This move is a government hedge against a possible short feed and grain crop in 1946.



Wide World

THAT DARKER BREAD

Secretary Clinton P. Anderson is showing his boss a loaf of bread baked with the 80 percent extraction flour, decreed by the President, as part of the latest food conservation plan.

Interim Sugar Plan Arranged With Cuba

THE U. S. Department of Agriculture reveals that an interim arrangement with Cuba has been made that insures normal shipments of 1946 crop Cuban sugar, pending the final negotiations on the 1946 purchase contract. Under the arrangements, Cuban raw sugar, as produced, is being shipped to the United States to the account of the Commodity Credit Corporation at a price of $3.675 per cwt. (free alongside), Cuba. This compares with a price of $3.10 per cwt. for the 1945 crop.

All sugar shipped will be subject to any terms that may be finally set forth in the 1946 Purchase Contract. The interim arrangement is of primary importance because it prevents any break in the flow of Cuban shipments.

The 1946 harvest on the island is just now reaching major proportions and will continue on an intensive basis through the early part of May. The 1946 Cuban crop is expected to total 4,700,000 short tons, raw value. The 1945 crop was about 3,900,000 short tons, raw value.

IFT Plans Are Set For Sixth Meeting

PLANS are nearing completion for the sixth conference of the Institute of Food Technologists to be held at the Statler Hotel, Buffalo, N. Y., March 17 to 20. Committees appointed by the president of the Institute, Dr. F. W. Tanner, professor of bacteriology, University of Illinois, report a well-balanced program, ample hotel facilities and an easing of pullman accommodations as of March 15.

An added session is the March 17 evening forum on "Teaching and Training of Food Technologists." Interest in this discussion is heightened by the continued heavy demand for trained professional food technologists, which began before the outbreak of World War II. Under the chairmanship of Dr. E. M. Mrak, food technology department, University of California, this forum is to develop plans for increasing the number and of strengthening the curricula of universities and colleges with organized courses in food technology.

Dr. B. E. Proctor, chairman of the committee on programs, announces that Dr. Bradley Dewey, president of Dewey and Almy Chemical Co., president of American Chemical Society and former rubber director of WPB, will be the guest speaker at the banquet, March 19.

A customary feature of the banquet is the presentation of the Nicholas Appert medal award for "preeminence in and contributions to the field of food technology." This award, established in 1942 by the Chicago section of the Institute, has been awarded annually. Dr. Clyde H. Bailey, University of Minnesota, has been voted the award this year for his research on the chemistry of wheat and on the use of wheat and wheat products, particularly wheat flour.

Industrial exhibits of equipment, supplies, materials and services in keeping with the technical sessions, have been arranged for by the exhibits committee of which John Fix, American Can Co., Rochester, N. Y., is chairman. They will be open during registration on Sunday and throughout the conference.

Food Processors Hold First Postwar Meeting

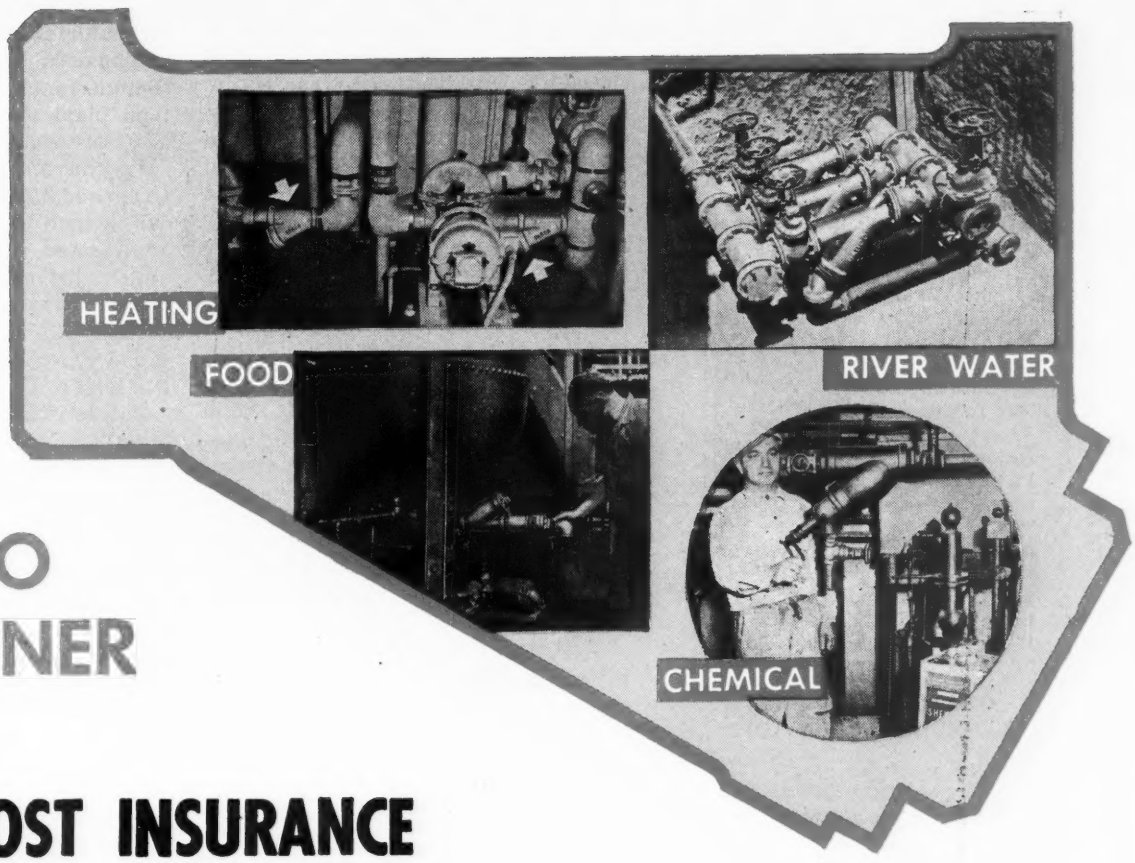
THE first postwar meeting of the National Canners Association and five of the major food processing associations, was being concluded when President Truman's new food plan, for helping to feed Europe, brought confusion and questions that could not be immediately answered.

No hint of the impending action was given by Secretary of Agriculture Clinton P. Anderson whose talk, two days before the President's announcement, contained no mention of additional cuts. The secretary in describing the overall prospects of the food industry in 1946, did say that subsidies will be continued on the major vegetables that remain under price control, if Congress provides the authority. This excludes snap beans on which price control has been suspended.

Prices of sweet corn, green peas and tomatoes for processing, he said, are to be the same as the area average prices for 1945. There will be a $5 per ton increase for lima beans and an eight cent per bushel increase for cucumbers. The government's needs for canned vegetables are expected to be about two-thirds of the take during the current season, but only about 15 percent of the amounts taken from the 1944-45 pack. The secretary cited the steady climb in per capita consumption of canned vegetables from 31 lb. prewar to from 40 to 45 lb. today.

Dean W. I. Myers, Cornell University, told the canners that farmers and the food industry may experience a jolt but not smashup, provided a collapse in general prices and severe unemployment can be avoided. The violence of the readjustment in agricultural prices, he said, depends on the trend of the general price level during the next few years. If the price level declines, farm prices will fall faster and farther. If the general price level remains stable, a moderate decline in farm prices may be expected.

The major importance of sanitation in postwar processing was evi-



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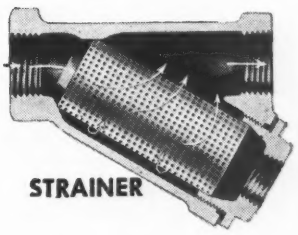
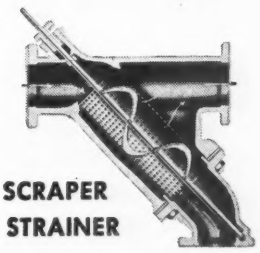
Sarco Strainers are effective and inexpensive insurance against costly shut-downs and heavy repair bills caused by dirt or scale in pipe lines. Keep a supply on hand and slip them in whenever changes are made. The cost is negligible.



STRAINER

FOR FOOD, CHEMICALS AND OIL

Sarco strainers are used to strain such products as syrup, varnish, orange juice, fuel and lubricating oils in the process of manufacture. Chemical and steel industries using large quantities of river water employ strainers on pipe lines up to 8 inches.



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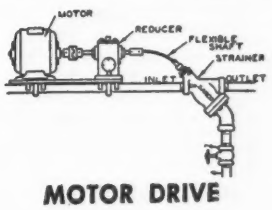
The SARCO SCRAPER STRAINER (Patented)

A helical, knife-like scraper rotated by hand or by motor is fitted snugly inside the screen wall, for conditions requiring continuous removal of solids without interruption of service.

Standard Sarco strainers are made in four types, ¼" to 8" for pressures up to 900 pounds. Scraper strainers ¾" to 8" and 200 pounds. Ask for Bulletin No. 1200.



MOTOR DRIVE

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QUICK FROZEN VITAMIN RICH
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. . . a booklet that tells the story of quick frozen fruit juice and explains why La Vel Juices are "best seller" items. La Vel Juices—extracted from "pick o' the crop" fruit and *instantly frozen* to preserve full flavor and valuable vitamins—are *all* pure juice . . . nothing added, nothing taken away. The new, convenient, 12-ounce containers assure La Vel Juices selling better than ever!

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Send for your free copy of "The Story of Frozen Sunshine".

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Paper supply houses—so often overlooked by grocery and household product salesmen—do an incredible volume of business in the food field. This, and a dozen other key channels, are covered regularly, coast to coast, by our 300 trained sales specialists. We offer manufactures a sales program which, for quick results, profit, national coverage, consumer and retailer acceptance and low sales cost, few—if any—organizations in the country can match. You can spend a profitable hour with us any time you choose.

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denced by the interest displayed in the various discussions touching on the subject as well as by the equipment displayed. The largest gathering of the canners' meeting attended the discussion on the possibilities in electronic sterilization, which was led by H. A. Benjamin and O. F. Ecklund, research department, American Can Co. Tests made thus far, while probably of far reaching technological significance, offer little in the way of immediate application. Suitable equipment, even if available, would run to around $200,000, while operation would amount to 12 times the cost of sterilization by steam. Kenneth A. Smith, Los Angeles consultant, disputed the high cost claim, however, declaring that by proper application, electronic sterilization costs can be cut considerably under steam.

J. E. Hall, Pict Sweet Foods, Inc., led the discussion on chlorination of the cannery water supply, in which it was brought out that the "break" point is higher than generally recognized. In these instances, the solution to the chlorine taste in the water is the addition of enough more chlorine to bring about a neutralizing reaction. Water also entered into another discussion session, headed by C. L. Smith, research department, Continental Can Co., on the relations of spoilage to rough handling and contaminated cooling water.

The canning industry's sanitation program was presented by N. H. Sanborn, of the N. C. A. research laboratories. He outlined the points emphasized by Dr. Paul B. Dunbar, commissioner of F&DA, to insure food plant sanitation. Mr. Sanborn also stressed the importance of the "May-Have" clause in the Food, Drug and Cosmetic Act of 1938, under which food may be deemed adulterated if it has been processed under insanitary conditions, even though no extraneous matter is actually found in the food.

The Frosted Food Packers heard Dr. Albert C. Hunter, Food & Drug Administration, outline the stringent practices and policies through which F&DA will enforce the food plant sanitation laws and directives.

Officers

Fred A. Stare, Columbus Foods Corp., Columbus, O., was re-elected president of the National Canners Association as were all the other officers, with the exception of the first vice-president, which went to Emil Rutz, Schuckl and Co., Inc., Sunnyvale, Calif.

Other association presidents elected during the week were: E. E. Huddleston, Stokely-Van Camp Co., Oakland, Calif., National Association of Frosted Food Packers; Graham Adams, Chicago, National Dehydrators; George Senn, Senn Products Corp., Brooklyn, N. Y., National Preservers; Lewis A. Hirsch, Hirsch Bros., Louisville, National Pickle Packers; Roscoe M. Roberts, American Can Co., New York, Canning Machinery and Supplies.

Wide World

WAR BRIDE SEES SIGHTS

Declaring that she hadn't seen so much food since the war started, this British wife of a former GI goes shopping with her husband and son, shortly after her arrival in U. S.

How should an adhesive REACT TO MOISTURE?

WHAT kind of moisture? Bathroom condensate . . . freight car humidity . . . quick-freeze dew formation . . . mildew damp . . . or merely tongue wetting to seal an envelope?

An adhesive must either *resist* moisture or *respond* to moisture. To what degree? That depends upon the product's final use. And the degree of reaction affects the adhesive formulation.

For in addition to its major function of adhesion, an adhesive must be able to withstand all normal or unusual conditions of use. It must protect the seller's product by keeping it tightly sealed in its container . . . maintain the product's identity by keeping it permanently labeled . . . or fulfill the product's function by reactivating to moisture for final adhesion.

Adhesive formulation is a task for a specialist. It requires a complete knowledge of the surface factors, application methods and field conditions that determine the final sales protection an adhesive can give to your product. National is an adhesive specialist. We're ready to help you — NOW!

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EVERY TYPE OF ADHESIVE FOR EVERY INDUSTRIAL USE

BUMP PUMPS

WILL DO YOUR PUMPING JOB *Better!*

here's why

FIG. 1

FIG. 2

FIG. 3

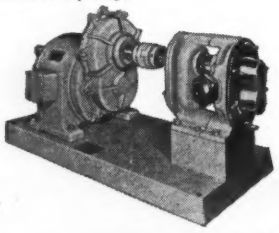
FIG. 4

Note the principle of operation illustrated and you will See why Bump Pumps have a low maintenance cost. The internal seals do not revolve and there is no contamination of the fluid being pumped, as the bearings are entirely separate from the pumping chamber. There are no grease cups and no internal threads — only 2 moving parts. Bump Sanitary Pumps are easy to clean and easy to maintain.

As one food processing company that has been using a large number of Bump Pumps in operation for years says: "We use Bump Pumps because, in our opinion, they do a better job at a lower total cost to us than any other pump now offered on the market".

Bump Sanitary Pumps are positive action, self-priming under head pressures, and deliver a constant volume per revolution, regardless of speed or pressure. They can be operated at slow speed without churning action, vibration or agitation within the pump.

Available in capacities from 1/2 to 300 GPM. Illustrated is Bump Sanitary Direct Drive model, one of the models in the complete line. Fully illustrated catalog upon request.



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LA CROSSE ★ WISCONSIN

FINAL PROGRAM

Institute of Food Technologists

Hotel Statler, Buffalo, N. Y. **March 17, 18, 19, 20, 1946**

March 17, 9:30 a. m.

Council Meeting.

March 17, 7:30 p. m.

Forum: Teaching and Training Food Technologists.
Chairman—Dr. E. M. Mrak.

March 18, a. m.

Quality Control.
Chairman—Dr. F. W. Tanner.
1. What Determines Quality in Foods, F. W. Fabian.
2. Objective Measurements of Quality in Foods, H. R. Smith.
3. Stability of Protein in Foods and Its Practical Significance, H. P. Lundgren.
4. Enzyme Control and Recent Developments in Food Industries, A. K. Balls.
5. Bacteriological Aspects in Food Handling and Processing, G. M. Dack.

Noon

Luncheon.
Chairman—Dr. B. E. Proctor.
The Atomic Bomb, J. H. Teeter.

Afternoon

I. Operations.
Chairman—Dr. L. V. Burton.
1. Pre-Sterilization of Canned Tomato Juice, J. M. Jackson, P. Sognefast.
2. Line Operation Design for Food industries, J. I. Thompson.
3. Cost Determination and Allocation in Food Manufacturing Operations, W. L. Campbell.
4. Peeling Methods and Their Role in Food Operations, P. C. Wilbur.
5. Materials Handling in Food Industries, Wm Geisler.
6. Equipment Design From the Standpoint of Heat Transfer, J. Donovan.

Afternoon

II. Flavor and Flavor Control.
1. Food Acceptability—Its Determination and Evaluation, W. F. Dove.
2. Salt and Its Place in the Food Industries, J. A. Dunn.
3. The Role of Anti-Oxidants in Flavor Problems, H. E. Longnecker.
4. Sugars and Their Uses in the Food Industries, W. R. Junk.

March 18, Evening

Smoker.

March 19, a. m.

Sanitation.
Chairman—Dr. S. C. Prescott.
1. Government Aspects of Food Plant Sanitation, A. C. Hunter.
2. Wartime Improvement in Rodent Control Agents, J. C. Ward.
3. Significance of Bacterial Growth Curves in Food Plant Control, C. R. Stumbo.
4. Quaternary Ammonium Compounds as Germacides in Food Plants, G. J. Hucker.
5. Waste Disposal Methods for Food Industries, N. H. Sanborn.
6. Sanitation Engineering and the Food Technologist, M. E. Parker.

March 19, p. m.

I. Milk Processing.
Chairman—Dr. P. H. Tracy.
1. The Use of the Vacreator in the Dairy Industry, G. H. Wilster.
2. Work Simplification in the Dairy Industry, J. C. Dunlap.
3. Disposal of Dairy Wastes, H. A. Trebler.
4. New Types of Stabilizers and Emulsifying Agents for the Ice Cream Industry, D. V. Josephson.
5. Use of the Direct Microscopic Count as a Control Measure in Dairy Plants, E. O. Anderson.
6. Mechanism of Autoxidation Reaction in Fat, J. R. Ramsey.
7. Our Newer Knowledge Regarding the Manufacture of Powdered Whole Milk, S. T. Coulter.

March 19, p. m.

II. Electronics.
Chairman—Dr. Roy Newton.
1. Electronic Regulation of Processes in Food Industries, L. Clardy, W. M. Urbain.
2. Blanching Vegetables by Electronics, J. B. Moyer, Elmer Stotz.
3. The Use of High Frequency for Defrosting Frozen Materials and for Treating Bread, H. G. Beattie, J. J. Parker, W. H. Cathcart.
4. The Fluorescence of Extracts of Dried Eggs, J. A. Pearce, W. A. Bryce.

Evening

Banquet.
Chairman—Dr. F. W. Tanner.
1. Nicholas Appert Award Presentation, R. V. Wilson.
2. Nicholas Appert Award Acceptance, C. H. Bailey.
3. Address—Dr. Bradley Dewey.

March 20, a. m.

I. Nutrition.
Chairman—Dr. C. E. Gross.
1. Unsolved Army Nutrition Problems, C. H. Berryman.
2. The Field Evaluation of Army Nutrition, R. Johnson.
3. Effect of Nutrition on Food Intake, S. Lepkovsky.
4. Amino Acids in Food and Analytical Methods for Their Determination, M. S. Dunn.

Morning

II. Dehydration.
Chairman—Dr. Wm. V. Cruess.
1. New Developments in Dehydration of Fruit Products, E. M. Mrak.
2. Potato Granule Dehydration, R. Kneuneman.
3. Army Contributions to Dehydrations, C. G. Dunn, M. E. Highlands.
4. Dehydration of Orange Juice in Vacuum Belt Drier, J. C. Sluder, E. M. Kenyon, R. Olsen.
5. Engineering Aspects of Dehydration, C. Birdseye.

Morning

I. Frozen Foods.
Chairman—Victor Conquest.
1. Problems in Precooked Frozen Foods Production, C. F. Evers, R. Hutchins.
2. Quality Control in Frozen Foods, G. A. Fitzgerald.
3. Development in Rail, Air and Ship Transportation of Frozen Foods and Raw Materials, D. F. Fisher.
4. Choice of Proper Packaging for Frozen Foods, A. Dearing.
5. Freezing Processes for Fruits, I. T Olsen.
6. A Brining Mechanism for Comestibles, M. P. Vucassovich.
7. Prepackaging of Fruits and Vegetables, C. W. Hauck.

Afternoon

II. Foreign Food Observers.
Chairman—Col. R. A. Isker.
1. European Operation of the Fats and Oils in Meat Packing Industries, G. T. Carlin.
2. War and Postwar Army Food Research, R. A. Isker.
3. European Cereal and Baking Operations, C. G. Harrell.
4. German Wartime Food Packaging and Processing, R. W. Pilcher.

Afternoon

III. Special Research Papers.
Chairman—Dr. Carl Pederson.
1. Solid Concentrates from Fruit and Vegetable Juices; A New Consumer Product, L. P. Geer.
2. The Effect of Various Cooking Methods on the Vitamin Retention in Vetetables; Thiamin and Ascorbic Acid, J. McIntosh, E. Jones.
3. Carotene Retention in Carrots; A Comparison of Storage by Freezing Preservation and Storage in the Root Cellar, F. A. Lee.
4. Reduction of Bacterial Count in Egg Pulp by Use of Germicides in Washing Dirty Eggs, V. Penniston, L. R. Hedrick.
5. Relationship of Moisture Content to Quality Retention in Dehydrated Vegetables During Storage, I. Tomato Flake, C. Dunker.
6. The Effects of a Tryptophane Deficient Diet Supplemented With Vitamin E on the Growth and on the Vitamin A. Stores of Rats, A. B. McCoord, C. P. Katsampse, S. W. Clausen, B. L. Goff.
7. Shelf-Life of Low-Solids Grape Gels, G. L. Baker, C. W. Woodmansee, E. E Meschter.

WRIGHT'S Automatic Machinery Company ★

Look Wright for New Advances In Automatic Packaging Machinery

Wright's Automatic Machinery Company will introduce three new automatic packaging machines at the Packaging Exposition in Atlantic City, April 2-5. Exhibit Booths 50, 51 and 52.

CELLULOSE BANDING MACHINE

Automatically applies contractible cellulose bands to the neck of bottles to provide the bottle with a sealing member. Primarily designed for the liquor, wine, food, cosmetic and drug industries.

MAY-PLEX CELLOPHANE WRAPPER

Automatically wraps, seals, and affixes labels on the ends of peanut butter cracker type sandwiches. Primarily designed for cracker sandwiches, cookies, and fig bars.

HY-TRA-LEC WEIGHER

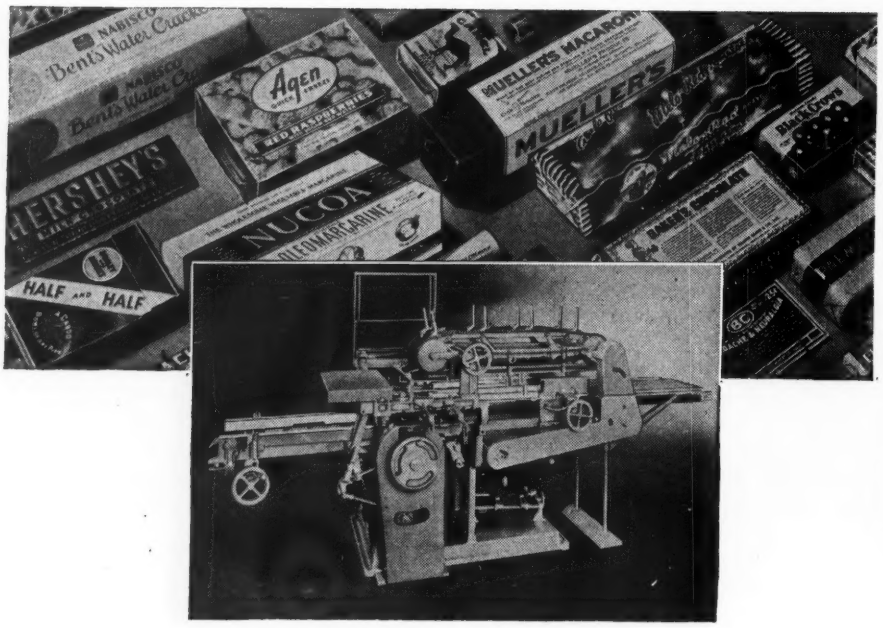
Automatically weighs and discharges free flowing and non-free flowing materials at predetermined net weights with a degree of accuracy at high speeds previously unattainable. Employs a principle of weighing new in automatic packaging machinery. Primarily designed for weighing potato chips, the Automatic HY-TRA-LEC WEIGHER will have wide utility where accuracy and speed are essential.

(The new HY-TRA-LEC Platform Weigher, non-automatic, will also be exhibited. This machine will interest those companies whose quantity of production or setup may not warrant purchase of the Automatic HY-TRA-LEC WEIGHER.)

WRIGHT'S Automatic Machinery Company ★

DURHAM, NORTH CAROLINA

"Pioneers Since 1893 In Automatic Packaging Machinery"



An Invitation to Visit Us at the

PACKAGING EXPOSITION

ATLANTIC CITY AUDITORIUM

APRIL 2-5 BOOTH 2

(Second Booth on right as you enter Exhibit Hall)

The first postwar Packaging Exposition is something you can't afford to miss! For you can appreciate what advancements in packaging machinery, methods and materials have been made during the war and in the period immediately following.

We'll be there — ready to tell you about our new and improved machines. And we'll be equally pleased to give you our recommendations regarding any special problems you may have.

You'll want to know, we are sure, what you can expect in the way of faster wrapping machines...What has been done to give our machines greater adjustability...How these machines can be adapted to your particular needs...What is taking place in the development of new types of wrapping materials.

You'll also want to learn of the latest applications of machine wrapping to new merchandising ideas. For example, fruit, vegetables, textiles and a host of other products never packaged before are now going to market in new and attractive machine-made wraps.

So make a note now to put the Exposition on your list of April "musts".

PACKAGE MACHINERY COMPANY, Springfield 7, Massachusetts
30 Church St., New York 7 • 111 W. Washington St., Chicago 2 • 101 W. Prospect Ave., Cleveland 15
182½ Spring St., N.W., Atlanta 3 • 443 S. San Pedro St., Los Angeles 13 • 18 Dickens Ave., Toronto 8

PACKAGE MACHINERY COMPANY

Over a Quarter Billion Packages per day are wrapped on our Machines

Ohio State to Give Food Locker Course

A FROZEN FOOD LOCKER operators' school is to be conducted at Ohio State University, from March 26 to May 30. Sponsored by the university's college of agriculture, the course will be given in cooperation with the colleges of arts and science, engineering, and medicine, the Ohio department of health, the Frozen Food Locker Manufacturers and Suppliers Association and the National Frozen Food Locker Association, Inc.

The lectures are to cover the preparation and processing of meat, poultry, fruits and vegetables. Three field trips, one each to Cleveland, Dayton and Cincinnati, and one visit to Columbus locker storage plants, are also scheduled.

Standard Milling Gets Best Foods Properties

STANDARD MILLING CO., Chicago, took over Best Foods' milling and grain elevator properties March 1. The purchase involves approximately $11,000,000. Standard Milling has been a subsidiary of Best Foods since 1929. The new company will acquire the family flour trade names of Ceresota, Hecker's and Aristos. Best Foods will retain its cereal and self-rising cake flour business.

Operating personnel and executives of Standard Milling will be retained unless they desire to affiliate with Best Foods. J. C. Beaven will continue as president of the new corporation and W. C. Engel as vice-president.

Grain elevators and flour mills acquired include those located at Kansas City, Kans., Kansas City, Mo., Minneapolis, and Buffalo.

Agriculture May Get Fish and Wild Life

THE transfer of the Fish and Wild Life Service from the Department of the Interior to the Department of Agriculture continues to be a live issue. There are strong forces supporting the idea, and equally strong forces opposing it.

It has been suggested that Fish and Wild Life Service be made a separate department of the government, operating without a cabinet member at its head. This would relieve Fish and Wild Life of much of the political activity that necessarily surrounds a cabinet office.

Those who oppose the transfer to Agriculture do so on the grounds that the two are antagonistic and that Fish and Wild Life would not

Look!

DIFUSO

TRADE MARK REG. U.S. PAT. OFF.

The Insect-Killing Champion

IS BACK AGAIN!

Hello, Difuso . . . Goodbye Insects!

Yes, Difuso is back with an impressive war record which proved again that when Difuso appears, insects *disappear*. Just let Difuso go to work for you and the answer to *your* insect-control problems can be as simple as that. Its regular use will protect your high standards of sanitation. Its safety and economy will safeguard your profits. Its penetrating effectiveness will keep your establishment completely insect-free. Difuso is available *now* from your regular wholesaler—order it today.

DIFUSO
Is Back Again

in the familiar green and white can . . . with stepped-up killing power . . . at no increase in cost . . . and with these advantages:

SAFETY
ECONOMY
PENETRATION

Another Product of

THE TANGLEFOOT COMPANY

Grand Rapids 4, Michigan

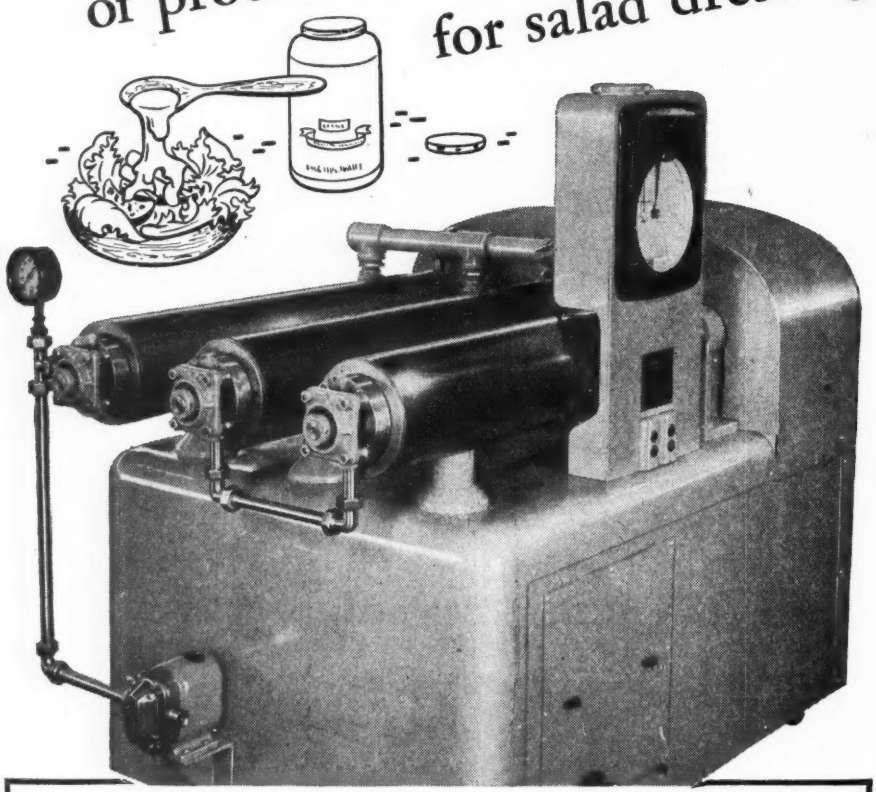
NEW YORK • CHICAGO • KANSAS CITY

Makers of

Tanglefoot Gummed Kraft Sealing Tape, Difuso and the *Difusolier, Tree Tanglefoot,* and Tanglefoot *Fly Paper*

NEW METHOD

of processing Starch Paste for salad dressing



BASED on a remarkable improvement in the mechanics of heat transfer, the VOTATOR* heats and cools starch slurry *as it flows through the unit.* The slurry is processed into starch paste in a fraction of the time formerly required, and an amazing volume is turned out in relation to the floor space required by the VOTATOR unit. The model shown occupies less than 25 square feet of floor space, processes 1800 pounds of starch paste per hour. Completely closed and under mechanical control, it prevents contamination and assures uniform texture.

VOTATOR advantages apply to many food products which are processed in a liquid or viscous state and require heating and cooling. More than 75% of all the margarine and vegetable shortening produced in this country is processed with the VOTATOR. It is fast supplanting lard rolls in the meat packing industry. It is being successfully used for the slush freezing of fruit and vegetable purees, concentrates, pulps, juices, and for wine cooling.

Write for complete information on this new processing method as it applies to your products. The Girdler Corporation, VOTATOR DIVISION, Dept. FI-3, Louisville 1, Kentucky. Branch offices: 150 Broadway, New York 7, N. Y., 619 Johnston Building, Charlotte 2, North Carolina.

THE Votator
A GIRDLER PRODUCT

HEAT TRANSFER AND PROCESSING EQUIPMENT

**Trade Mark Reg. U.S. Pat. Off.*

Wide World

NEW STUDY

Students at the vocational high school in New Bedford, Mass., are learning to make butter right at home. All that is required, we are told, is just a little patience, some effort and some heavy cream, especially cream.

receive a sympathetic administration if it were housed in the "South" Building. This is based on the reasoning that every pound of fish consumed displaces agricultural products in the domestic diet.

Alcohol From Wood Expected in Oregon

OPERATION of the Oregon plant to make alcohol from wood waste should begin in midsummer, according to forecasts of the Forest Service. That agency sponsored completion of plant when building was interrupted shortly after V-J day as WPB withdrew its sponsorship. As now planned, the total expenditure is expected to be nearly $3,000,000.

The capacity of the plant is estimated at 5,000,000 gal. of ethyl alcohol per year, an increase of nearly 25 percent over the original plan. Abundant waste wood is available and sufficient acid and other chemical supplies seem assured. It remains to be determined how practicable and efficient the plant will prove to be on full scale operation. Recent estimates of Forest Service indicate that the alcohol might cost about 36 cents per gallon, including rent to Defense Plant Corporation and a small "profit" to the commercial operators.

Consumer Education

AN expanded five year program, on consumer education about bakery products, was launched by the directors of the American Institute of

Glass

THE PERFECT SALESMAN

HE never asks for overtime pay and stays on the job constantly. He never strikes nor complains. He's inherently honest. He has an open, friendly face and inspires instantaneous confidence. He speaks the most eloquent sales language known —"See for yourself," he says. "See the attractive contents of this package. See the uniformity, the texture, the size, the freshness and the true color of the product." He speaks this language so convincingly and unerringly that he creates many extra impulse sales.

This perfect salesman is the sparkling, clear Anchorglass Container. It displays your product with all its colorful eye and appetite appeal. Since it imparts no foreign tastes or flavors, it delivers your choice foods to the consumer with all these qualities intact. Then too, it is easy and safe to open and can be tightly resealed to protect unused portions.

In short, the Anchorglass Container is the perfect salesman.

Anchor
CONTAINERS and CAPS

Hear in ANCHOR HOCKING'S HOBBY LOBBY
CBS NETWORK . . . THURS. EVE.

PRODUCTS OF
ANCHOR HOCKING GLASS CORPORATION
LANCASTER, OHIO

USE

Spiceolates

FOR BETTER SPICE FLAVORS

CALL D & O WITHOUT DELAY!

D&O Dodge & Olcott, INC.

180 VARICK STREET, NEW YORK, N. Y.

BOSTON • CHICAGO • PHILADELPHIA • ST. LOUIS • LOS ANGELES

Plants and Labs., Bayonne, N. J.

This COMMUNITY REFRIGERATION CENTER Serves Over 15,000 Customers

5,000 Refrig. Food Lockers

10,000 Furs in Storage

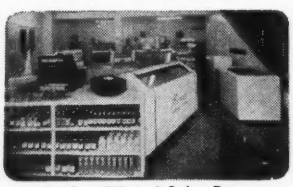
48,000 Cu. Ft. Freezer Storage

Pat Denham's model plant, covering an entire block at Oklahoma City, provides ten distinct services: it has the world's largest food-locker system, safekeeps 10,000 furs, operates a general freezer storage, makes crystal-clear ice, processes all kinds of foods, does quick-freezing, sells frozen foods, runs a restaurant, has a gas station, and includes a big laundry. Frick refrigerating, ice-making, and air conditioning equipment carries all the cooling loads.

Bulletin 126 tells how any town or city can profit from a similar COMMUNITY REFRIGERATION CENTER. Write for your copy now.

FRICK COMPANY, Waynesboro, Pa.

14-Ton Ice-Making System



Air Conditioned Sales Room

Restaurant Service

Baking at their meeting held in Chicago in February. This program was recommended by the industry relations committee to the board of directors. They approved the report and appropriated $75,000 from the reserve funds of the Institute to get the program started. It is planned to provide a minimum annual budget of $175,000 for the next five years, beginning with 1946, to carry on this expanded work.

ACS to Administer New Enzyme Award

AN annual award of $1,000 and a bronze medal for outstanding research in enzyme chemistry has been added to the list of awards administered by the American Chemical Society, it is announced by Alden H. Emery, national secretary of the society.

The new award is sponsored by the Paul-Lewis Laboratories, Inc., Milwaukee, Wis., and will be known as the Paul - Lewis Laboratories Award in Enzyme Chemistry. It was established to stimulate fundamental research, by young graduates of American colleges or universities, in the field of enzymes. These are complex substances, such as pepsin, that act as catalysts in the digestion of food, and in certain other transformations of material.

The first Paul-Lewis Laboratories Award will be presented by the society in April to one of a group of candidates now under consideration by a special committee.

PROCESSING

New Food Standards Hearings Announced

AS predicted some time ago, the Food and Drug Administration plans to hold hearings to consider definitions and standards of identity for corn meals and related products. Hearings will begin at 10 a. m., March 18, in room 5440 of the Social Security Building, 4th and Independence Avenue, S. W., Washington, D. C. Edward E. Turkel has been designated as presiding officer.

For those unable to be present in person to give moral testimony and to be cross-examined, interested persons may submit affidavits to the presiding officer on or before March 18. These affidavits should be in quintuplicate and may be made a part of the record of the hearings, if they are relevant and material.

"The bigger the family—the better the service"

CONTINENTAL

C PAPER DIVISION

CAN COMPANY, INC.

FIBRE DRUMS The Container Co., Van Wert, Ohio

LIQUID-TIGHT FOOD CONTAINERS — Boothby Fibre Can Co. Roxbury, Mass.

PAPER CUPS AND FOOD CONTAINERS — Mono Containers Newark, N. J.

COMBINATION PAPER AND METAL CONTAINERS

Headquarters: 330 W. 42d St., New York 18, N. Y.

13 Plants—Sales offices in all principal cities

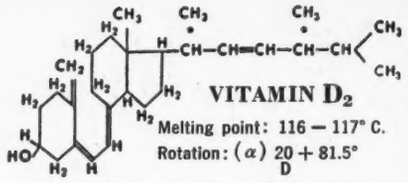
CONTINENTAL is a big family offering a wide variety of paper packages—liquid-tight paper containers and cups, fibre cans and drums . . . packages that safely carry your product everywhere (yes, and into every room in the house). The famous Continental Triple C trade mark stands for one company with one policy—to give you only the best in quality and service.

Tune in: "CONTINENTAL CELEBRITY CLUB" *every week over coast-to-coast CBS Network*

Winthrop ANNOUNCES New Low Prices on—

PURE CRYSTALLINE Vitamin D_2

★ (CALCIFEROL)



VITAMIN D_2

Melting point: 116 — 117° C.

Rotation: $(\alpha)_D^{20} + 81.5°$

Write For Details and New Price Schedule

Winthrop's synthetic vitamin D_2 (Calciferol) is free from lumisterol, toxisterol, suprasterol, and other by-products of irradiation. It never varies in antirachitic potency.

OTHER WINTHROP PURE SYNTHETIC VITAMINS:

- **TRIDEE**—Winthrop's Brand of vitamin D_3 in Corn Oil
- **VITAMIN B_1** (Thiamine Hydrochloride)
- **VITAMIN B_2** (Riboflavin)
- **NIACINAMIDE**
- **VITAMIN B_6** (Pyridoxine Hydrochloride)
- **CALCIUM PANTOTHENATE**
- **VITAMIN C** (Ascorbic Acid)
- **d-ISO-ASCORBIC ACID . . .**
- **AMINO-ACIDS**

Valine	Glutamic Acid
Cystine	Tryptophane
Tyrosine	Phenylalanine
Leucine	Methionine

- **"B-E-T-S"**—Winthrop's Brand of Bread-Enrichment Tablets
- **"VEXTRAM"**—Winthrop's Brand of Flour-Enrichment Mixture

POTENCIES AND PACKINGS:

Crystalline Form in vials of one, five, and ten grams.

Solution in Corn Oil: 1,000,000 U.S.P. Units per gram* packed as follows:

400 Standard Units	2,500 Standard Units
1,000 Standard Units	50,000 Standard Units

Also Solution in Corn Oil: 400,000 U.S.P. Units per gram packed as follows:

250 Standard Units	1,000 Standard Units
500 Standard Units	20,000 Standard Units

*Standard Unit=1,000,000 U. S. P. Units

WINTHROP

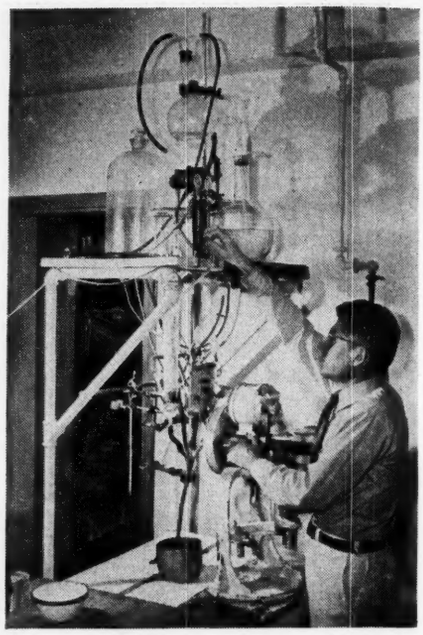
For prices and information address

Special Markets Division

WINTHROP CHEMICAL COMPANY, INC.

170 Varick Street, New York 13, N. Y.

★ Sole Manufacturer under U.S. Patent 1,902,785 granted to Winthrop Chemical Company, Inc.



Wide World

MEASURING DEVICE

The USDA Laboratory at Beltsville, Md., uses this device to automatically measure the various ingredients for the new darker bread. Possible errors are thus greatly reduced.

Suggested standards of identity to be considered at the hearings have been set forth on the following commodities: White corn meal, yellow corn meal, bolted white corn meal, bolted yellow corn meal, degerminated white corn meal, degerminated yellow corn meal, white corn flour, yellow corn flour, grits (corn grits, hominy grits), yellow grits (yellow corn grits, yellow hominy grits), enriched corn meals, and enriched corn grits. These suggested regulations, which are subject to adoption, rejection, amendment, or modification, were printed in the Federal Register for Wednesday, February 13, on pages 1600 to 1602 over the signature of Maurice Collins, acting administrator of the FSA.

F&DA has also been having correspondence with some of the canners regarding the possibility of establishing quality standards for canned string beans. Because of travel conditions, preliminary spade work may be done entirely by correspondence rather than by informal meetings of the Standards Committee in Washington. At the date of writing, however, no final plans had been announced on this subject.

Canning Labor

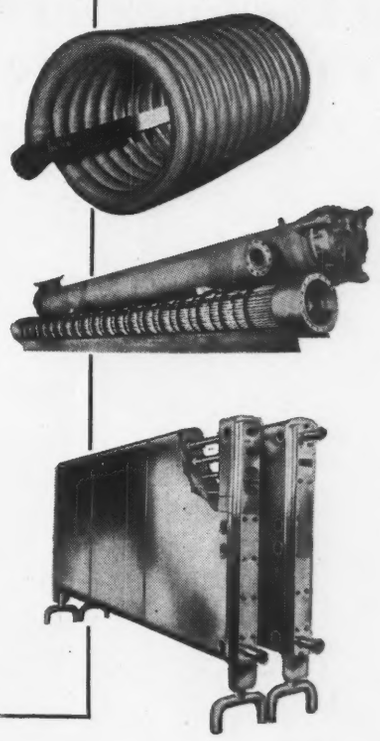
APPROXIMATELY 450 delegates to the 23rd annual convention of the Northwest Canners' Association, at Gearhart, Ore., were warned not to be lulled into a sense of false security by current reports of a surplus labor

Easier ROLLING-IN

Better FLOW CONDITIONS

Uniform HEAT TRANSFER

with Carpenter "Heat Exchanger Quality" Stainless Tubing!



UNIFORM WALLS throughout every length of this Stainless Tubing assure that the finished job is "seated" perfectly for pressure or vacuum applications. Reduces chance of uneven work hardening of tube sections when rolling-in. Expansion is the same at all points of the tube's circumference.

UNIFORM HEATING is another advantage provided by uniform tube walls. There are no "heavy sections" of the tube wall to slow down processing, and the tubes are free from thin spots that might cause premature failure.

LESS MAINTENANCE and less "down time" for equipment are other advantages of this Stainless Tubing. There's the full corrosion and heat resistance of Stainless Steel, throughout every length of Carpenter Stainless Tubing.

IMPROVED FLOW CONDITIONS are provided by the smooth I. D. and O. D. surfaces which provide protection against sludge and scale deposit.

AND YOU SAVE 30 to 40% on cost of material alone when you use Carpenter "Heat Exchanger Quality" Stainless Tubing. Your savings increase as fabricating troubles disappear and equipment stays on the job longer.

ASK FOR THIS NEW SLIDE CHART OF TECHNICAL DATA

In convenient form, this slide chart gives you useful information on:

- Mass Velocity Constants (V_m)
- Velocity Constants (V1)
- Cross Sectional Areas of Tubes
- Sq. Ft. Internal and External Surface per Lineal Ft. of Tube
- Physical Properties of Stainless Tubing

A note on your company letterhead will start your Stainless Tubing Slide Chart on its way. Write for your copy today.

THE CARPENTER STEEL COMPANY

Welded Alloy Tube Division • Kenilworth, New Jersey

Carpenter

WELDED

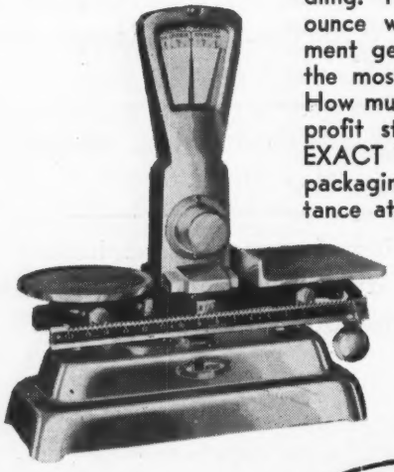
STAINLESS TUBING

How to Package a Light Food Product in Small Packages

EXACT WEIGHT Scales packaging potato chips on a well planned production line. Wolverine Potato Chip Co., Detroit, Michigan.

do it the Exact Weight Way...

Packaging a light food product such as potato chips or corn chips in volume requires specialized conveyor equipment, good scales and trained operators if profits are expected. Potato chips for example are easily broken, require careful handling. Profit margins are such that sound fraction-ounce weighing is necessary. Although equipment generally is required for efficient handling the most important operation is hand weighing. How much goes into the bag is important from a profit standpoint. The fact that thousands of EXACT WEIGHT Scales are used in this type of packaging everywhere is evidence of the importance attached to this operation.



EXACT WEIGHT Scale Model #103. Most popular model in the industry for hand weighing operations. Dial 1 oz over and under weight by fraction ounces. Equipped with platter or scoop as wanted. Capacity to 3 lbs.

INDUSTRIAL PRECISION

Exact Weight Scales

THE EXACT WEIGHT SCALE COMPANY

21 W. FIFTH AVE. COLUMBUS 8, OHIO

Dept. T, 783 YONGE ST. *Toronto, Canada*

market. Representing Lee C. Stoll, Oregon director of USES, J. D. Wilson, rural industries supervisor, said that 1946 may be as tough as, or worse than, any of the war years insofar as recruiting adequate manpower for the food processing industry.

Pectin Subs for Sugar In Chocolate Creams

A NEW METHOD of making centers for chocolate creams that uses a modified pectin jelly, beaten to give smoothness and light texture, may prove a boon to candy manufacturers in the present sugar shortage and also to candy eaters who must watch their calories. It has been developed by agricultural and industrial chemists of the U. S. Department of Agriculture in cooperation with the National Confectioners Association.

The new mixture has the taste, texture and appearance of the cream centers used in the finest quality candy but requires only half as much sugar.

The modified pectin, which has made possible this new candy cream as well as many other new jelly products, was developed by the Western Regional Research Laboratory at Albany, Calif., in the course of research on new by-products from fruit. The chemists call it "low-methoxyl pectin." They developed it by modifying pectin from citrus peel by the action of an enzyme also in citrus peel.

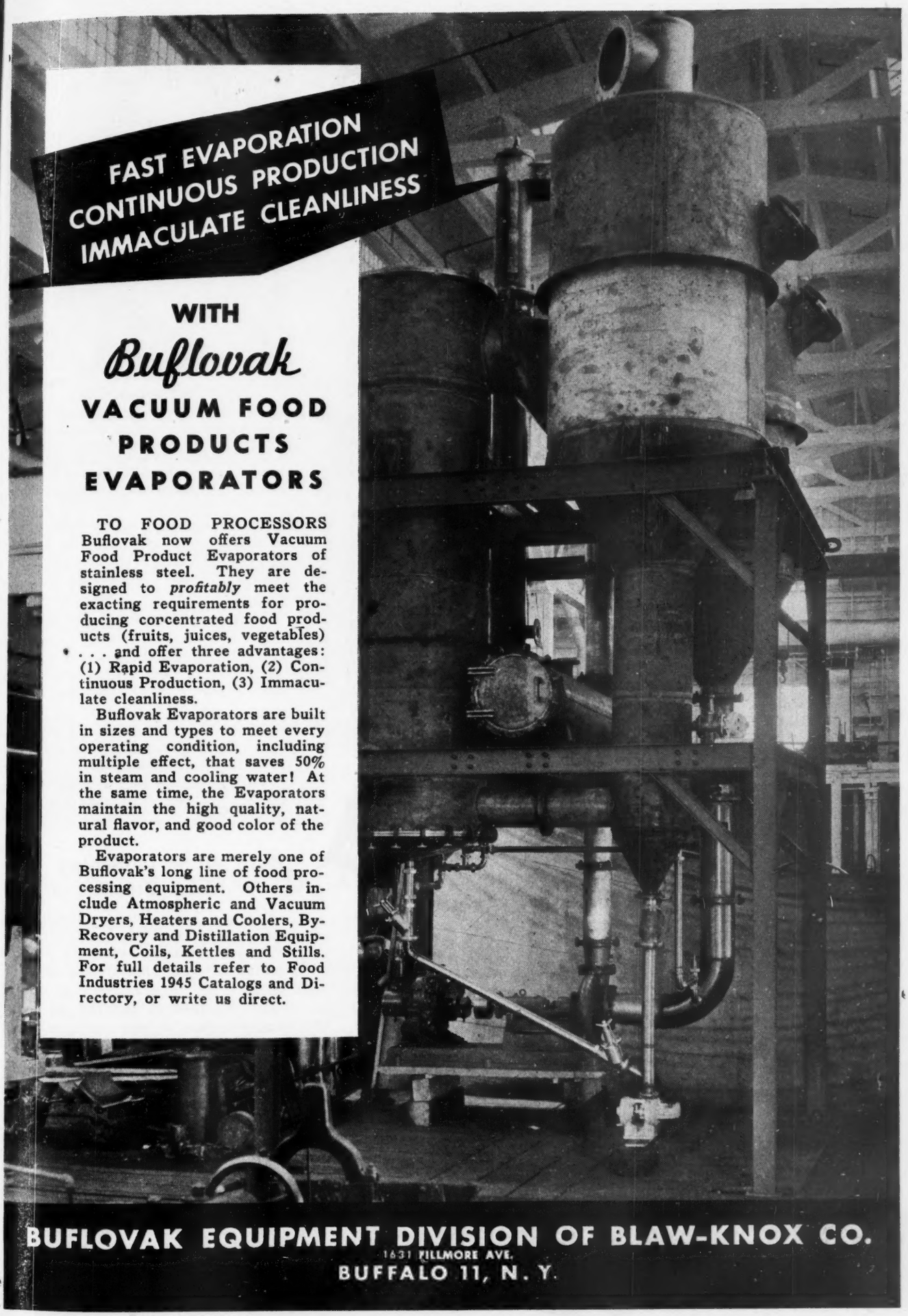
Candy manufacturers are greatly interested in the new formula but must wait to put it to use until they can obtain sufficient supplies of the new pectin from plants now going into operation.

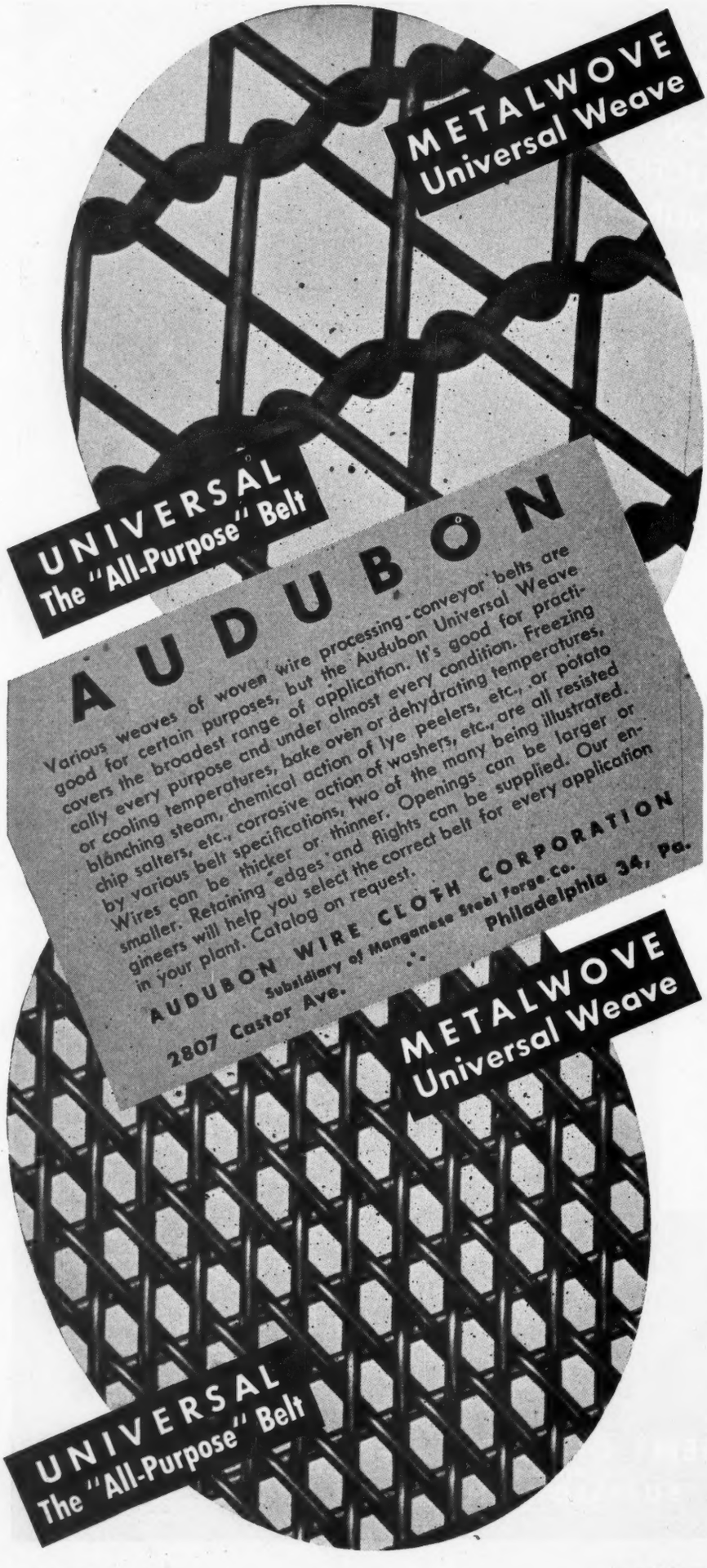
Citrus Concentrates Starts Rebuilding

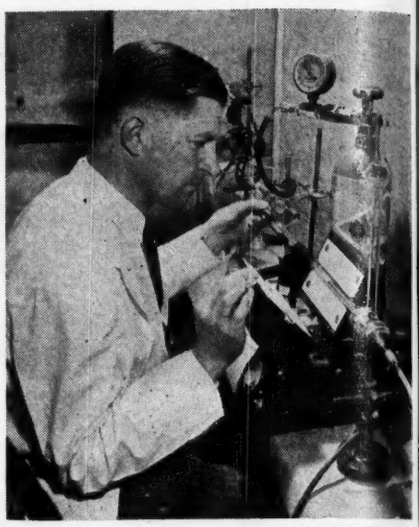
CONSTRUCTION of a new main plant of Citrus Concentrates, Inc., to replace the one destroyed completely last August in a $2,500,000 blaze, (FI, Oct. 1945, p. 117) was scheduled to begin at Dunedin, Fla., about March 1st.

Actual clearing up of the tangled mass of twisted steel debris began early in January, after B. C. Skinner, president of the concern, had worked out rebuilding plans with government officials in Washington.

Mr. Skinner, estimating it would take about five weeks to clear up the rubble resulting from the most disastrous fire in the history of the Florida citrus industry, said the new building would be erected on


FAST EVAPORATION
CONTINUOUS PRODUCTION
IMMACULATE CLEANLINESS
WITH
Buflovak
VACUUM FOOD
PRODUCTS
EVAPORATORS
TO FOOD PROCESSORS
Buflovak now offers Vacuum Food Product Evaporators of stainless steel. They are designed to *profitably* meet the exacting requirements for producing concentrated food products (fruits, juices, vegetables) . . . and offer three advantages: (1) Rapid Evaporation, (2) Continuous Production, (3) Immaculate cleanliness.
Buflovak Evaporators are built in sizes and types to meet every operating condition, including multiple effect, that saves 50% in steam and cooling water! At the same time, the Evaporators maintain the high quality, natural flavor, and good color of the product.
Evaporators are merely one of Buflovak's long line of food processing equipment. Others include Atmospheric and Vacuum Dryers, Heaters and Coolers, By-Recovery and Distillation Equipment, Coils, Kettles and Stills. For full details refer to Food Industries 1945 Catalogs and Directory, or write us direct.
BUFLOVAK EQUIPMENT DIVISION OF BLAW-KNOX CO.
1631 FILLMORE AVE.
BUFFALO 11, N. Y.


METALWOVE
Universal Weave
UNIVERSAL
The "All-Purpose" Belt
AUDUBON
Various weaves of woven wire processing-conveyor belts are good for certain purposes, but the Audubon Universal Weave covers the broadest range of application. It's good for practically every purpose and under almost every condition. Freezing or cooling temperatures, bake oven or dehydrating temperatures, blanching steam, chemical action of lye peelers, etc., or potato chip salters, etc., corrosive action of washers, etc., are all resisted by various belt specifications, two of the many being illustrated. Wires can be thicker or thinner. Openings can be larger or smaller. Retaining edges and flights can be supplied. Our engineers will help you select the correct belt for every application in your plant. Catalog on request.
AUDUBON WIRE CLOTH CORPORATION
Subsidiary of Manganese Steel Forge Co.
2807 Castor Ave. Philadelphia 34, Pa.
METALWOVE
Universal Weave
UNIVERSAL
The "All-Purpose" Belt



Wide World

DETERMINATOR

Dr. A. J. Haagen-Smith, professor of bio-organic chemistry at Cal. Tech is pictured preparing "micro-fractionation" apparatus used for micro-carbon-hydrogen determination in analysis of vitamins and food flavors, as well as hormones and anti-malarial drugs.

the foundation of the destroyed main building, which covers 160,000 sq. ft.

Stating the actual cost of constructing the new plant would be "well over $1,000,000," Mr. Skinner expressed the hope that Citrus Concentrates would be able to operate during the next canning season, which normally begins about November 1st.

"Whether or not we can begin operations at that time," he said, "depends almost entirely on our ability to get new machinery and equipment in time to replace that destroyed in the fire."

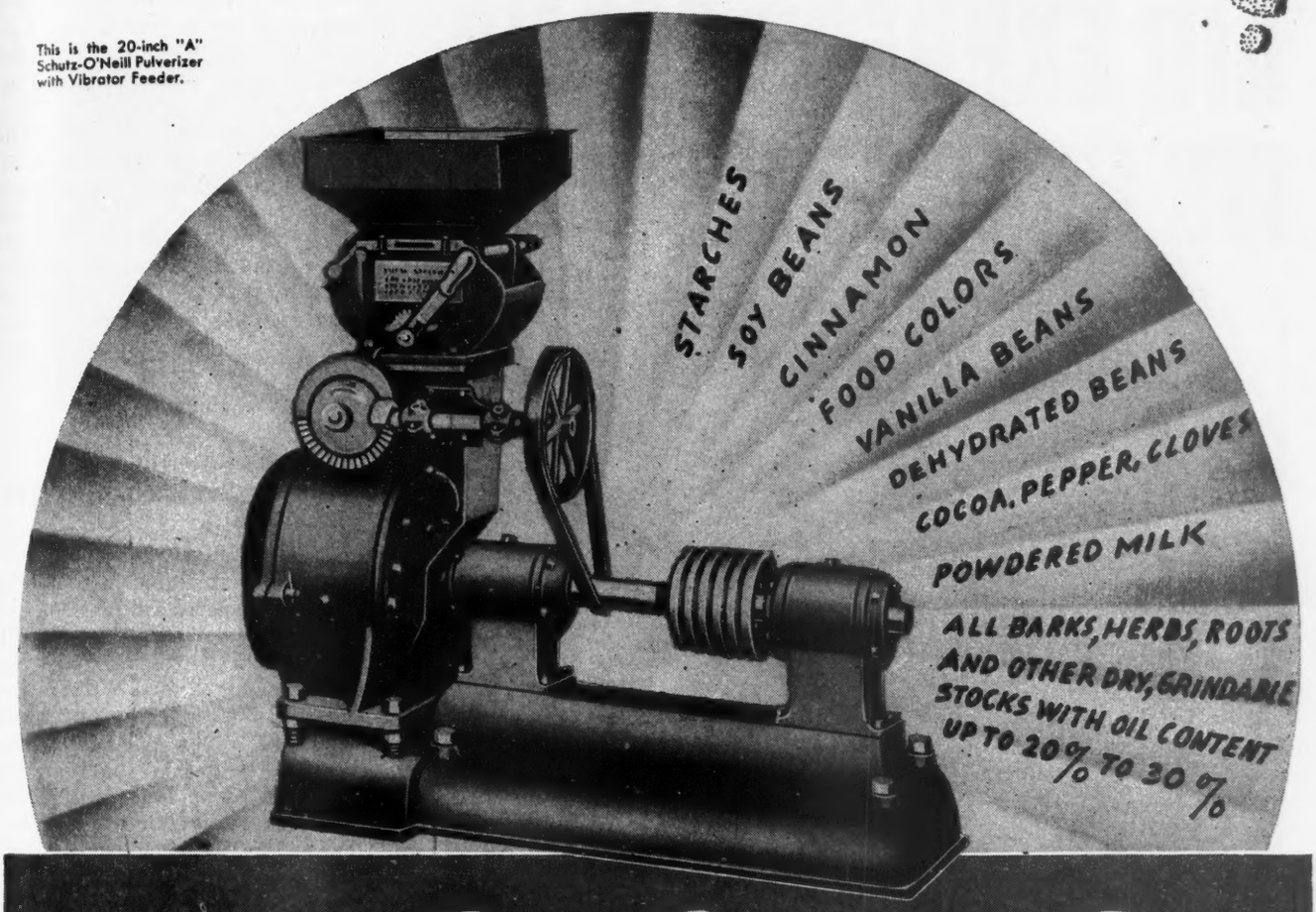
Hard Water Blanching Adds Calcium to Peas

PEAS and snap beans, blanched in different types of potable water prior to quick freezing, were not significantly affected with regard to their vitamin or mineral content, except that vegetables blanched in hard water showed an increase in calcium, according to findings of food chemists at the state experiment station, Geneva, N. Y.

Many studies have been made of the effect of blanching on the nutritive value of vegetables that were to be preserved by freezing. No information has been available, however, on the possible effects of different types of blanching waters, such as hard water, water containing iron, and chlorinated water. Recent studies made at the station compared these types of water with distilled water. The effect on the vitamin and

WHAT DO YOU PULVERIZE?

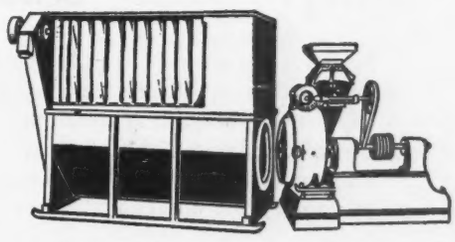
This is the 20-inch "A" Schutz-O'Neill Pulverizer with Vibrator Feeder.



You Can do it Finer, Faster and Better with the SCHUTZ-O'NEILL PULVERIZER

The Schutz-O'Neill Pulverizer is a centrifugal air force impact pulverizer for continuous or batch operation. For extremely fine grinding and uniformity, the principle of centrifugal impact when carried by the air stream has never been surpassed. The product is floated off on air —there is no screen to clog or wear out. Thousands of Schutz-O'Neill Pulverizers have proven their sturdiness, long life, low power consumption, high output and ease of operation. With a range of sizes in several styles, any dry, grindable stock can be efficiently pulverized.

CONSULT US ON YOUR PULVERIZING PROBLEMS. Write us your requirements, products to be pulverized, output desired, and send a sample. This in no way obligates you. Literature sent on request.



MILL PLAN shows a popular set-up for a 28-inch Pulverizer with an expansion Tubular Collector with elevator discharge.

ESTABLISHED 1893

SCHUTZ-O'NEILL CO. DIVISION OF PARTEN MACHINERY CO.

PULVERIZERS · BREAKER MILLS · ROLLER MILLS · BURR MILLS · HAMMER MILLS

306 SIXTH AVENUE SOUTH · MINNEAPOLIS 15, MINNESOTA

When Time Means Money
AIR EXPRESS EARNS ITS WEIGHT IN GOLD

22% slash in rates since 1943 makes this fastest delivery service a better business buy than ever

Do you need something fast — to keep your business going and men at work, to serve a customer or to *get* one? Do you need "delivery speed" on new merchandise or sales pieces to keep a customer happy? Then use Air Express. Let its speed save time (a matter of hours from coast-to-coast). And the time you save means money — money that makes this fastest delivery service "earn its weight in gold!"

HERE'S HOW LITTLE IT COSTS (U. S. A.)

AIR MILES	2 lbs.	5 lbs.	25 lbs.	40 lbs.	Over 40 lbs. Cents per lb.
149	$1.00	$1.00	$1.00	$1.23	3.07
349	1.02	1.18	2.30	3.68	9.21
549	1.07	1.42	3.84	6.14	15.35
1049	1.17	1.98	7.68	12.28	30.70
2349	1.45	3.53	17.65	28.24	70.61
Over 2350	1.47	3.68	18.42	29.47	73.68

Specify Air Express — Better Business Buy Than Ever

Shipments go everywhere at the speed of flight between principal U. S. towns and cities, with cost including special pick-up and delivery. Same-day delivery between many airport towns and cities. Fastest air-rail service to and from 23,000 off-airline points in the U. S. Service direct by air to and from scores of foreign countries in the world's best planes — manned by the world's best crews — giving the world's best service.

AIR EXPRESS

AIR EXPRESS

GETS THERE FIRST

Write Today for new Time and Rate Schedule on Air Express. It contains illuminating facts to help you solve many a shipping problem. Air Express Division, Railway Express Agency, 230 Park Avenue, New York 17. Or ask for it at any Airline or Railway Express office.

Phone AIR EXPRESS DIVISION, RAILWAY EXPRESS AGENCY
Representing the AIRLINES of the United States

mineral content of the vegetables was recently reported in "Food Research."

The method of blanching and of cooling the blanched vegetables used in the experiments resembled home processing more than it did methods employed in the commercial processing of peas and snap beans. This is believed to account for the higher vitamin C content of the experimentally blanched vegetables as compared with those blanched by standard commercial methods. However, after six months' freezing storage, the difference in vitamin C content had disappeared, with the result that peas packed by home and commercial methods contained substantially the same amounts of vitamin C.

Frozen Apple Juice Holds Up in Tests

A POSSIBILITY is being held out that frozen apple juice may become a marketable commodity in the future, according to successful tests made by the food technology division of the University of California. The experiments, directed by Dr. W. V. Cruess, professor of food technology, proved that fresh apple juice and sharp cider both held their natural flavor and color after as long as 12 months in storage, while juice preserved by other methods turned darker, losing the fresh flavor.

Marketing for use in hospitals and restaurants could be done, Dr. Cruess said, by packing the juice in gallon lots, adding that paraffined containers would be more acceptable than the cellophane bags now used.

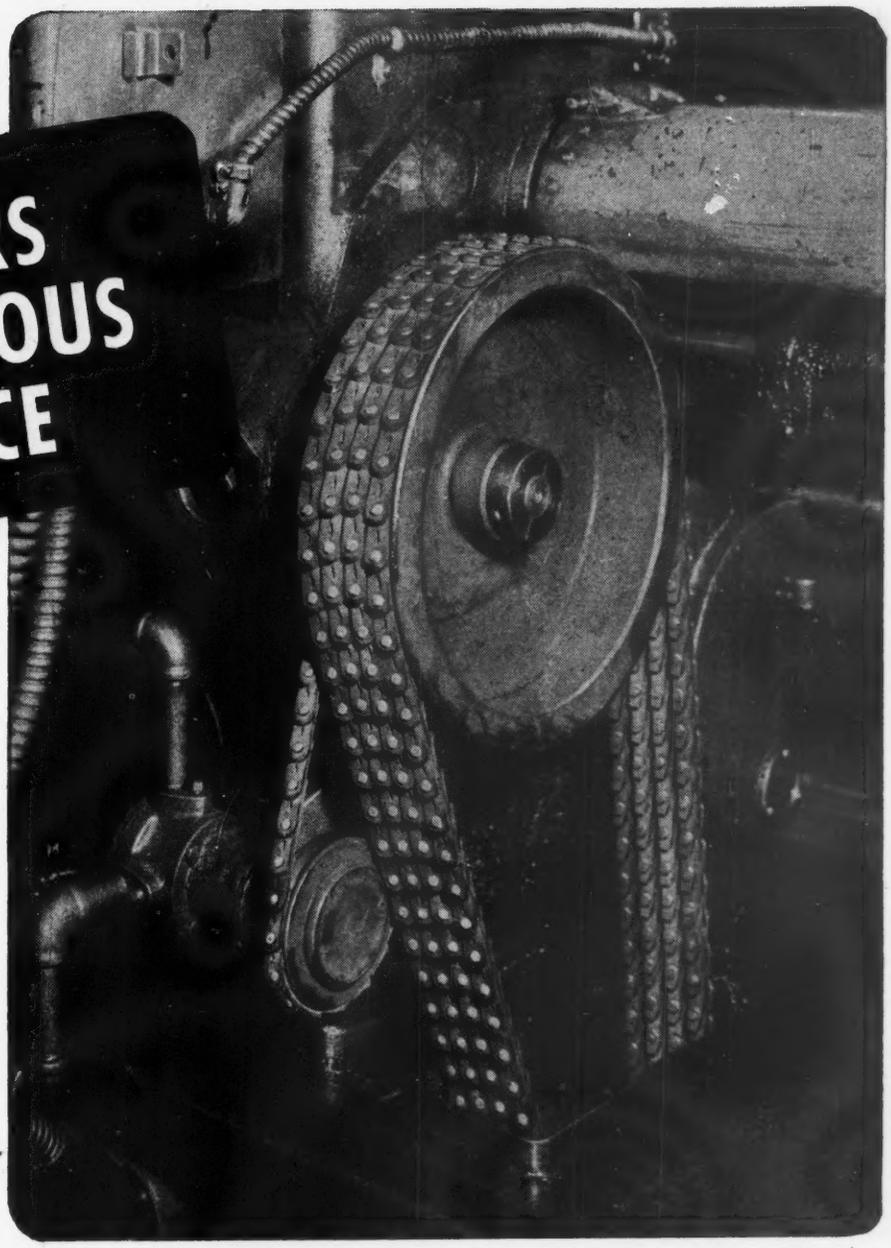
The new process opens to producers the prospect that an extension of their market period can be extended beyond the usual season.

Loss of Trap Sites Faces Alaska Canners

THE Department of the Interior came out into the open when public hearings were scheduled for late February to discuss a plan for the redistribution of trap sites in southeastern Alaska. The proposed commercial fishing regulations for 1946 would, if adopted, deprive canners of some of their present trap sites. "It is contemplated," stated the Department of the Interior in the notice appearing in the Federal Register of February 2, "that, in future regulations, permit holders will be required to reduce the number of trap sites that they may operate progressively within a 5-year period until they have a maximum of 10 traps in

2 YEARS CONTINUOUS SERVICE

without 1 Adjustment



Two Veelos V-belt drives on No. 5 Gisholt Lathe. 4 Veelos "B" belts operate the main drive; 1 Veelos "B" belt operates the oil pump.

ON FEBRUARY 3, 1944, five Veelos V-belts were installed on this No. 5 Gisholt Lathe—located in a large steel plant. They have been in continuous operation ever since—*under severe conditions. Yet these belts have never once been adjusted and are reported remarkably free from slip.* Idlers used on the former belt installation were removed when Veelos went on.

On all V-belt drives that call for uniform belt tension without difficult adjustment and for freedom from slip, link construction makes Veelos the logical choice because:

Link Construction Maintains Uniform Tension

Easy adjustment of Veelos length assures that each strand of a multiple V-drive carries its exact share of the load. All strands constantly work together, *delivering full power.*

Link Construction Ends Slip

Veelos link construction provides quick, easy tension adjustment to end slip . . . keeps machinery running at full speed and productivity.

In many food plants, Veelos has set a record for outstanding performance. Write today for the full story.

MANHEIM MANUFACTURING & BELTING CO.
MANHEIM, PENNSYLVANIA

LINK CONSTRUCTION UPS PRODUCTION

VEELOS
THE LINK
V-BELT
Adjustable to any Length
Adaptable to any Drive

BIG FOOD PACKER SAYS...

"Our product requires utmost care in growing through shipping. Former packing proved inadequate . . . Silverstitching was installed. Cartons are now stronger, unaffected by dampness."

USE THE CLOSURE COMBINATION WITH THE

Seal

UNAFFECTED BY DAMPNESS

SilverStitch — STAPLING WIRE

SilverStitchers — STAPLING MACHINES

- One-piece, continuous length, 5 and 10 pound coils . . . cuts loading time
- Always manufactured uniform in width and gauge
- Galvanized to resist rust
- Makes stronger, surer closures than other methods . . . unaffected by weather
- Few moving parts . . . vital ones reversible . . . for lower maintenance costs
- Adjustable, single pedal, footrest treadle control
- Operate easily, quietly
- Heavy duty construction, low power consumption . . . for long, thrifty service

SEALING SHIPPING CONTAINERS BY STITCHING IS FASTER, STRONGER, AND MORE ECONOMICAL

ACME STEEL COMPANY

NEW YORK 17 ATLANTA CHICAGO 8 LOS ANGELES 11

Wide World

MILLIONTH TREE

California avocado growers, last month, celebrated the planting of the 1,000,000th avocado tree by taking this picture of a full grown one—tree that is. Why the lady was there can be explained, but who cares why?

1950." It is apparent that the Department of the Interior intends to force the issue "long delayed because of the war emergency."

The plan proposed by the department goes far beyond the question of aboriginal rights, which was recently decided against the Indian petitioners from the same area. The Indian claims, which the Secretary of the Interior finally rejected recently, would have placed almost all the land in southeastern Alaska, from Juneau to Prince Rupert, in Indian reservations. In this area are many of the principal fishing sites and canning operations.

The purpose of the latest proposals, as slated by the Department of the Interior, are "to make it possible, by decreasing the concentration of sites in the hands of a few major companies, to allow individuals, particularly residents of Alaska, to have an opportunity to operate traps during the coming fishing season."

The amendments seem to have been made without consideration of the peculiarities of the "love life" of the salmon and economic risks to canners resulting therefrom.

Claim Potato Bread Holds Quality Longer

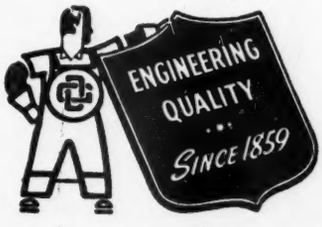
INTRODUCTION of a "live potato culture" to improve bread has been announced by Peter Pan Bakeries, Detroit. A comprehensive advertising campaign is being mapped by the company to promote the culture.

We Joined Pump and Motor to Save You *Time and Trouble*

In Gardner-Denver Close-Coupled Centrifugal Pumps, pump and motor are combined in a complete, compact unit, entirely assembled and ready for service. Gardner-Denver Close-Coupled Centrifugals can be installed in any position—on the floor, on the wall or on the ceiling, either horizontally or vertically!

The higher efficiency of these Gardner-Denver Centrifugals starts in the foundry, where rigidly controlled practices assure smooth inside surfaces. Water passages and impeller blades are carefully proportioned to produce the most efficient operation over a broad working range.

For full information write Gardner-Denver Company, Quincy, Illinois.



GARDNER-DENVER
Since 1859

Gardner-Denver Close-Coupled Centrifugals are available in sizes to handle from 5 to 1200 g.p.m. against heads of from 10 to 300 feet.

STAINLESS STEEL STORAGE and PROCESSING TANKS

INCREASE PRODUCTION and EFFICIENCY IN YOUR PLANT WITH THESE SPECIALIZED TANKS

Metal-Glass San-I-Tanks give you safe, clean and rapid handling of any chemicals or liquids. These modern tanks are constructed throughout of 18-8 Stainless Steel making them immune to all acids and exceptionally easy to keep clean.

Tanks are finished with No. 4 polish on inside and bright finish outside. All Stainless Steel welded with inside welds ground smooth and polished.

San-I-Tanks incorporate special self-draining features with specially formed bottoms sloping to the front.

Built by tank specialists, San-I-Tanks incorporate every time saving, money saving feature. For years of trouble free service insist on San-I-Tanks.

MANY SIZES IN STOCK — READY FOR IMMEDIATE SHIPMENT

We endeavor to have a supply of stock sizes in San-I-Tanks on hand at all times. We have a tank for every application and in any size you need. Write us giving complete data on the size tank you need and we will, in many cases, have the tank in stock.

LET OUR ENGINEERS SOLVE YOUR SPECIAL TANK PROBLEMS

In addition to our complete line of stock sizes in San-I-Tanks which are stocked for immediate shipment, we also manufacture special sizes built to your requirements. If you have a special tank problem get in touch with us and our engineers will be glad to give you their suggestions. No obligation of course. It it's a tank problem we can solve it for you. Over 20 years of tank building experience backs the San-I-Tank so play safe and work with a tank specialist.

Write for Complete Literature and Prices

Metal-Glass Products Co.

Dept. FI. Belding, Michigan

Among claims made for potato bread using the new mix is that it can stay on pantry shelves for weeks and remain as fresh when opened as the day it left the oven. Peter Pan Bakeries have been using the culture in tests in Detroit since last May. Sales in the Detroit area climbed 97 percent during the test.

The new culture is said to introduce a new taste and finer texture. It acts as an anti-mold agent, regardless of humidity or temperature. The culture, which is similar to yeast, was discovered eight years ago by a Lansing, Mich., bread chemist. Upon his death, manufacturing rights were acquired by E. L. Schafer, president of Peter Pan.

Approximately 60 bakeries nationally have adopted the culture since its test introduction, Mr. Schafer said.

DISTRIBUTION

No End in Sight for Current Tin Shortage

THERE is nothing in the picture to indicate an increase in the amount of tin that could be allocated for the manufacture of tin plate, according to a responsible official of Civilian Production Administration.

The United States must continue to depend upon tin from Latin American sources to bolster the declining stockpile. Efforts have been redoubled to increase the flow of concentrates to the Texas smelter.

The arrival of a shipment of only 14 tons of tin, which reached the U. S. from Batavia, late in January, started a wave of optimistic speculation that shipments in quantity soon could be expected from the Far East.

There is nothing to warrant such optimism. Washington officials expect small shipments of tin to dribble in during the next few months but not in sufficient quantity to ease the current shortage.

Army Food Stocks Cut By Cancelled Orders

STORES of government-held food in Chicago have been reduced from 10,000 carloads, in December, to 455 in mid February, according to Col. E. D. Ellis, commanding officer of the Chicago quartermaster depot. All contracts for rations and non-perishable foods were cancelled after V-J day. This cancellation resulted in appreciably lowered stocks in government and commercial warehouses. The Quartermaster Corps is still

IRON VALVES with a Background

The Complete Powell Line also includes Bronze and Steel Valves and Valves of all necessary types and materials for corrosion resistance.

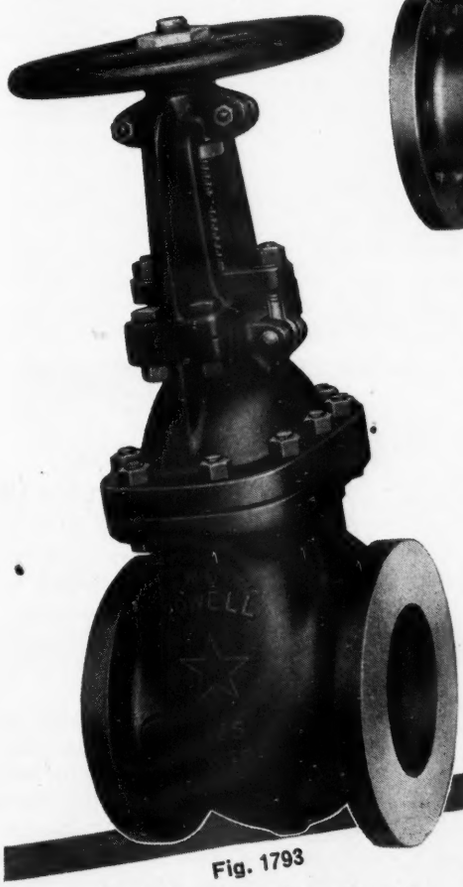


Fig. 1793

Fig. 241

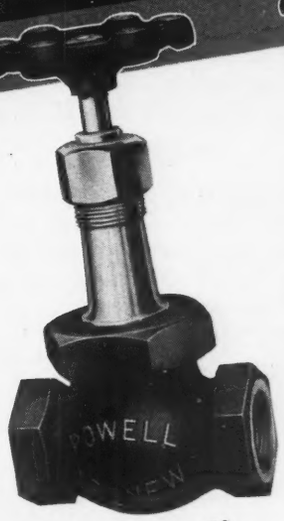


Fig. 190

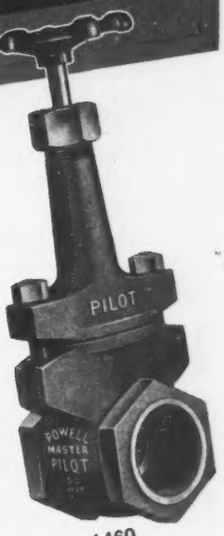


Fig. 1460

100 YEARS of scientific achievement and practical experience lie behind the Complete Powell Line of Iron Body Bronze Mounted and All Iron Valves for steam, oil, water, gas and process lines.

In many services in flow control these valves will do just as good a job as valves of more costly materials. And in certain services they will do a better job than any other kind.

For every installation where an Iron Body Bronze Mounted or an All Iron Valve is indicated, Powell has the correct type, size and design to assure better performance and longer life—at the least cost of maintenance. Powell Engineers will be glad to advise you where you can profitably use Iron Valves in your flow control system. Catalogs on request.

The Wm. Powell Company, Cincinnati 22, Ohio

DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

Fig. 1793—Iron Body Bronze Mounted Gate Valve for 125 pounds W. S. P. Flanged ends, outside screw rising stem, bolted flanged yoke, bronze seat rings and taper wedge solid disc. Sizes 2" to 30", inclusive. Also available in All Iron for Process Lines.

Fig. 241—Iron Body Bronze Mounted Globe Valve for 125 pounds W. S. P. Flanged ends, outside screw rising stem, bolted flanged yoke and regrindable, renewable bronze seat and disc. Sizes 2" to 16", inclusive. Also available in All Iron for Process Lines.

Fig. 190—Iron Body Bronze Mounted "Irenew" Globe Valve for 150 pounds W. S. P. Has screwed ends, union bonnet and regrindable, renewable wear-resisting nickel-bronze seat and disc. Sizes ¼" to 3", inclusive. Also available in All Iron for Process Lines.

Fig. 1460—Iron Body Bronze Mounted "Master Pilot" Gate Valve with screwed ends, rising stem, bolted flanged bonnet and taper wedge solid disc. Sizes ¼" to 2", inclusive, for 150 pounds W. S. P.; 2½" to 4", inclusive, for 125 pounds W. S. P. Also available in All Iron for Process Lines.

POWELL VALVES

STEAM JACKETED KETTLES

of Quality . . . .

COPPER STEAM JACKETED KETTLES, for steam working pressure to 90 lbs. per sq. in.
Stationary Kettles, non-mixing — in sizes 15 to 500 gallon inclusive.
Stationary Mixing Kettles, with tilting agitators, for belt or motor drive — in sizes 25 to 500 gallon inclusive.
Tilting Kettles, non-mixing —in sizes 25 to 50 gallons.

STAINLESS STEEL KETTLES with carbon steel outer jackets, for steam working pressure of 90 lbs. and 125 lbs. per sq. in.
Stationary Kettles, non-mixing — in sizes 10 to 500 gallon inclusive.
Stationary Mixing Kettles with tilting agitator, for belt or motor drive — in sizes 30 to 500 gallon inclusive.
Tilting Kettles, non-mixing — in sizes 10 to 150 gallon inclusive.
Tilting Mixing Kettle with tilting agitator — in sizes 30 to 150 gallon inclusive.

Write for Bulletin H. B. 100

Hamilton
COPPER AND BRASS WORKS
HAMILTON OHIO • U.S.A.

AN IMPORTANT MESSAGE TO PLANT MANAGEMENT

Regarding Control of

SKIN IRRITATIONS

TARBONIS is effective in both preventing and clearing up skin irritations resulting from the handling of a wide variety of foodstuffs —too long immersion of hands in brine—constant contact with acid-type foods, etc.

Not merely a protective, TARBONIS is also effective in clearing up a high percentage of stubborn skin conditions encountered in industry. Easy to apply—nothing to remove. Pleasant, odorless, greaseless, stainless.

THE TARBONIS COMPANY
4300 Euclid Ave. Dept. FI Cleveland 3, Ohio
Please send me a good sized jar of TARBONIS and complete information.

NAME.....
ADDRESS.....
CITY.....ZONE.....STATE.....

moving the stocks out as quickly as possible and only 6,600 carloads of government food are now stored in all the warehouses in the U. S.

Army holdings include 371,787 lb. of tinned butter, 4,002,295 lb. of whole frozen eggs, 238,518 34-oz. cans of ham, 138,564 35-oz. cans of boned chicken and turkey, 2,821,301 cans of corned beef, 2,486,721 lb. of dehydrated pea soup, 9,857,904 cans of evaporated milk, 1,944,988 1-oz. chocolate bars, and 52,846 lb. of caramels.

Buy Dried Eggs for Export Commitments

A DRIED EGG purchase program, under which approximately 8,500,000 lb. are being bought for delivery in February and March, has been inaugurated by the Department of Agriculture. The dried eggs will be used to fulfill definite export commitments made by the department. Originally it was intended to fill these commitments with dried eggs processed from frozen eggs declared as "surplus" by the Army. The frozen eggs which amounted to 70,000,000 lb., were taken back recently by the Army, thus making it necessary for the department to buy dried eggs in the open market to meet these commitments.

RAW MATERIALS

Improved Apple Crop Foreseen for 1946

"THERE is every reason to believe that the small New York State apple crop of 1945 will be followed by a crop considerably above average in 1946," says Dr. A. J. Heinicke, director of the state experiment station at Geneva.

The prospects for the 1946 crop can still be modified considerably by killing temperatures in late winter or by frost and unfavorable weather during bloom, but an examination of fruit buds at this time reveals that in most orchards, which were reasonably well-cared for last season, there will be an abundance of bloom next spring, far more than is required for a bumper crop.

New York's 1945 apple harvest of 2,160,000 bu. was less than one seventh of the average production for the past ten years. Doctor Heinicke points out, however, that New York State also had a small crop in 1936, although it was three and a half times the 1945 crop.

"What beauty, what rhythm, what grace, what lines! GENTLEMEN, I am talking about this modern, well made Foster-Forbes Standard Line."

FOSTER-FORBES

Standard Line Bottles of Quality and Character

FOSTER-FORBES GLASS CO., MARION, INDIANA, U. S. A.

SALES REPRESENTATIVES
KANSAS CITY • DETROIT • CINCINNATI • CHICAGO • CLEVELAND • MILWAUKEE
ST. PAUL • ST. LOUIS • ATLANTA • NEW YORK • MEMPHIS • LOUISVILLE
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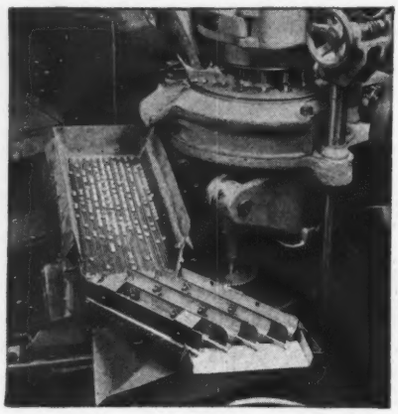


Whether it's PILLS — or DICED CARROTS

SYNTRON

"Vibra-Flow"

VIBRATORY FEEDERS

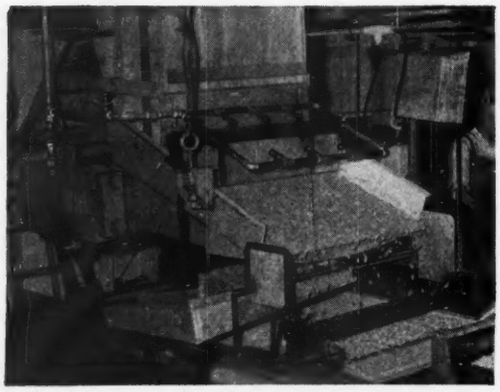
Provide the sanitary, easy-to-clean method of feeding and conveying food products.

Finger-tip rheostat control of material flow.

No moving, wearing, mechanical parts.

A wide range of models with capacities of from pounds to 500 tons per hour.

Write for literature.

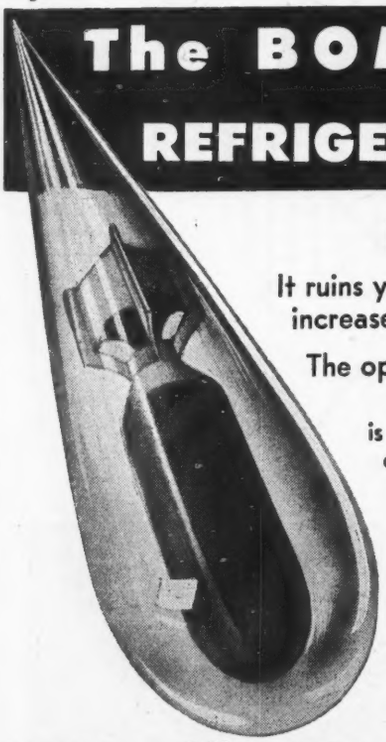


SYNTRON CO.

460 Lexington Ave.

Homer City, Pa.

The BOMB in your REFRIGERATED SPACES



is MOISTURE

It ruins your products, coats your coils with ice, increases refrigeration costs.

The opening in the

JAMISON VESTIBULE DOOR

is always closed unless filled with passing goods or men. It reduces refrigeration loss and moisture inrush to the minimum. Use it on busiest doorways.

JAMISON Cold Storage DOOR CO.

Jamison, Stevenson & Victor Doors

HAGERSTOWN MARYLAND

Branches in Principal Cities

JAMISON BUILT COLD STORAGE DOORS

Sharp Cut in Grains For Beverage Makers

RESTRICTIONS on the use of corn, wheat and rye by beverage distillers and a reduction of one-third in the number of days' mashing capacity in each of the months of March, April, May and June form part of the government's new food program.

The beverage distillers are authorized to purchase and use an amount equivalent to five full days' mashing capacity for the manufacture of beverage spirits. This applies during each month, March through June, on any grain other than wheat or wheat products and corn grading Number 1, 2 and 3, when purchased.

The program also provides that the quantity of rye used by each distiller shall not exceed six percent of the total quantity of grain authorized to be mashed, or 2,000 bu. of rye, whichever is greater. In no case shall the quantity of rye mashed exceed 15 percent of all grain authorized to be mashed during the month.

Top Sugar Harvest

A RECORD HARVEST of sugar from the Everglades this year is predicted by Clarence R. Bitting, president of the United States Sugar Corporation, who said that 296,751 tons of cane was converted into sugar in the first third of the season.

SCHEDULE OF EVENTS

MARCH

8—Canners League annual meeting, Fairmont Hotel, San Francisco.

11–14—American Society of Bakery Engineers, 22nd annual meeting, Edgewater Beach Hotel, Chicago.

18–20—Institute of Food Technologists, 6th annual meeting, Statler Hotel, Buffalo, N. Y.

20–22—Chicago Technical Societies Council, production show and conference, Stevens Hotel, Chicago.

25–26—Associated Retail Bakers of America, national convention, Sherman Hotel, Chicago.

27–31—Frozen Foods Institute, 5th annual exhibit, Park Ave. Armory, New York.

APRIL

1—Packaging Machinery Manufacturers Institute, Hotel Dennis, Atlantic City, N. J.

2–5—American Management Association, packaging exposition, Public Auditorium, Atlantic City, N. J.

8–12—American Chemical Society, Atlantic City, N. J.

18–19—Wisconsin Dairy Manufacturers, conference, University of Wisconsin, Madison, Wis.

24–26—Industrial Packaging Engineers Association of America, exposition, Sherman Hotel, Chicago.

25–27—National Fisheries Institute, first annual meeting, Continental Hotel, Chicago.

MAY

13–15—Millers National Federation, annual conference, Edgewater Beach Hotel, Chicago.

13–16—American Association of Cereal Chemists, annual meeting, General Brock Hotel, Niagara Falls, Ont., Canada.

15–17—American Oil Chemists Society, 37th annual meeting, Roosevelt Hotel, New Orleans, La.

FOR WORK UNIFORMS THAT STEP UP EFFICIENCY—*DEMAND*

REEVES ARMY TWILL

"FROM COTTON TO CUTTER"

Now you can specify durable, smart looking Reeves Army Twill for uniforms and work clothes. Its high tensile strength insures rugged wearability. It tailors smartly, too, and is color-fast to sun, water and perspiration. Sanforized Shrunk*, it is the fabric for long-lasting economy. Remember—over 90 million yards of this same fabric helped equip America's fighting men—exceeding Government specifications under the toughest climatic and combat conditions.

**Residual shrinkage less than 1%*

THE REEVES FABRIC GROUP INCLUDES: *Reeves Army Twill*
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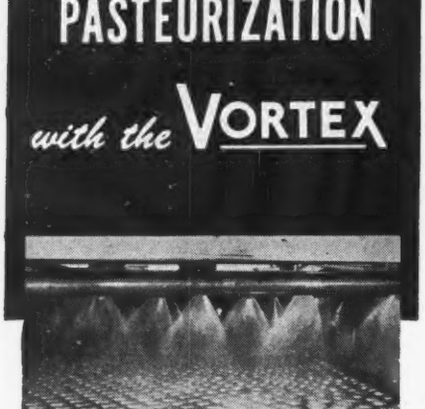
Get
POSITIVE AUTOMATIC CONTROL OF PASTEURIZATION
with the VORTEX



Vortex pasteurizers assure positive, accurate control of temperature and time, plus the advantage of completely automatic operation.

Thermal transfer is achieved through the medium of atomized water sprays, and temperature zones are designed with careful attention to heat reclamation so that consumption of steam is as economical as possible. Other design features include the patented "walking beam" conveyor, smooth hydraulic drive and a complete absence of gears, cams or chains.

Years of complete satisfaction are certain because of the durability of the design and measures taken to eliminate corrosion. It will pay you to get all the facts about the advantages of VORTEX machines for either pasteurization or cooling of foods. Send us your requirements and write for new technical bulletin.

BARRY-WEHMILLER MACHINERY CO.
1946... Our 61st Anniversary
St. Louis, Mo., U. S. A.

INDICATORS

Production

Flour production in January totaled 16,607,512 sacks in the Northwestern Miller's compilation. This compares with 15,586,914 sacks in December and 15,588,036 sacks for January, 1945.

Lard production increased in December, reaching 172,193,000 lb. as compared with 137,139,000 lb. during the previous month.

Creamery butter production in December declined 2 percent contra-seasonally from November. The output, estimated at 67,565,000 lb., was the lowest on record for the month since 1920. It was 23 percent lower than December, 1944, and 40 percent below the ten-year average.

Canned evaporated milk production failed to show its usual seasonal increase in December. The total, 163,650,000 lb., was slightly under November, 27 percent less than a year ago and 12 percent below the 1930-1943 five-year average. The total for 1945, 3,777,551,000 lb., however, established a new record, exceeding the 1944 output by 10 percent and the previous record output of 1942, by 7 percent.

The Department of Agriculture Has Released the Following Compilation on Canned Food Packs for 1945:

Canned Vegetables and Vegetable Juices	1945 pack estimate	1944 pack	1937-41 average pack
	(Million cases 24 No. 2's)		
Asparagus	4.5	4.3	2.9
Beans, lima	2.0	1.7	2 0
Beans, snap	19.5	18.6	10.5
Beets	9.0	8.7	4.0
Carrots	3.5	3.0	1.3
Corn	28.2	25.4	20.0
Mixed vegetables	2.5	2.4	....
Peas	39.6	31.7	23.8
Pumpkin and squash	3.0	2.9	2.6
Spinach	7.2	9.0	4.6
Tomatoes, whole	20.0	26.1	27.0
Tomato catchup and chili sauce	13.0	12.0	8.9
Tomato juice	30.0	30.8	16.1
Tomato paste	4.0	5.6	2.3
Tomato pulp and puree	10.0	9.5	3.1
Tomato sauce	5.5	4.5	1.6
Baby foods and vegetable purees	14.0	12.0	2.7
Baked beans	23.5	27.0	29.2
Sauer kraut	7.5	3.7	6.5
Soups	31.0	29.7	28.0
Sweet potatoes	2.0	1.5	1.2

Canned Fruits and Fruit Juices	1945 pack estimate	1944 pack	1937-41 average pack
	(Million cases 24 No. 2½'s)		
Apples	1.2	3.0	2.5
Applesauce	.9	3.1	2.2
Apricots	4.0	7.8	3.4
Berries	.8	.5	1.4
Cherries, sour	1.1	2.6	2.1
Cherries, sweet	1.3	.9	.7
Figs	1.0	.9	.4
Fruit cocktail	6.5	6.6	3.7
Peaches	14.5	13.6	12.4
Pears	5.2	4.6	5.3
Pineapple	9.4	9.0	9.3
Pineapple juice	6.4	5.8	6.9
Cranberries	1.3	.6	1.1
Fruit nectars	.2	.6	.8
Olives	1.0	.9	.8
Apple juice	1.0	1.8	.4
Grape juice	.6	1.2	1.2
Prune juice and other	1.8	1.7	.4
Plums and prunes	2.3	1.3	1.8

American cheese production continued its seasonal decline during December, the output totaling 42,115,000 lb. This was a 6 percent drop from November and 12 percent less than December, 1944. However, production was 24 percent larger than in any of the ten preceding years, from 1934 to 1943. Total output for 1945 was 875,301,000 lb., an 8.7 percent increase over 1944 and 45 percent above the ten-year average.

Meat production for the month of January declined 18 percent, according to the American Meat Institute. Beef and pork production were 15 and 18 percent lower, respectively, than in December, and lamb production, for January, was down 25 percent. Veal, in January, dropped 31 percent below December. The packing house strike was directly responsible for this lowered production.

Egg breaking operations, in December, were the smallest of the year, and much below the December level of the past several years. Liquid egg production dropped to 1,216,000 lb., compared with 16,282,000 in December, 1944. Dried egg production was only 166,000 lb., compared with 10,610,000 lb. in December a year ago. Frozen egg production also dropped in 1945, the total for the year coming to 378, 216,000 lb., compared with 511,791,000 lb. in 1944 and 412,615,000 lb. in 1943.

Canned fruits and fruit juices, excluding citrus, available to civilian markets from the 1945 pack, came to approximately 45,100,000 cases (24 2½'s) while canned vegetables totaled 247,500,000 cases (24 2's). These amounts compare with 34,300,000 and 204,400,000 cases available in the previous year, according to the National Canners Association.

The canned tomato pack in 1945 came to 16,757,750 cases, basis No. 2's, according to the National Canners Association, the smallest pack since 1931, and only 70 percent as large as the 1944 pack. This figure, however, is more than 3,300,000 cases under the government's figure listed in the table on the left.

Dry bean production in 1945 was 12,313,000 bags of 100 lb. cleaned weight basis, compared with 14,969,000 bags during the previous year. Allocation of dry beans, during the first quarter totals 3,020,500 bags, compared with the estimated disappearance of 5,007,200 bags in the corresponding period last year.

Semolina production for the first six months of this year is expected to about equal the 426,621,200 lb. produced from January to June, 1946.

Dry peas allocated for consumption during the first quarter amounts to 1,223,000 bags, compared with an estimated disappearance of 1,542,600 bags in the same 1945 period.

Materials

Corn on farms, January 1, amounted to 1,931,000,000 bu., the smallest in five years. On the other hand, "disappearance" of 1,071,000,000 bu. from farms since October 1 was the largest ever recorded, with the exception of the corresponding quarter in 1944.

Wheat in storage, on and off farms, on January 1, was estimated at 689,000,000 bu., the smallest in four years. Moreover, interior mills, elevators and warehouses report the smallest January 1 stocks since 1937.

Raw sugar deliveries to the U. S. in 1945 amounted to 6,041,382 short tons, a drop of more than 1,000,000 tons from the 7,147,350 tons delivered in the previous year. Total stocks of sugar in the hands of primary distributors, December 31, were 1,418,532 tons, as against 1,227,090 tons on the same date in 1944.

Durum wheat supplies were down to 25,716,000 bu. on January 1, according to Glenn G. Hoskins. This is about 4,500,000 bu. less than were on hand Jan. 1, 1945, when supplies available to mills were exhausted before the new crop was ready—and last year provided the smallest domestic supply since 1937.

Storage

Frozen fish and shellfish held on February 1 came to 115,525,834 lb., which compares with 78,970,565 lb. held on Feb. 1, 1945. The total frozen in January amounted to 6,598,786 lb., compared with 4,925,315 lb. during January a year ago.

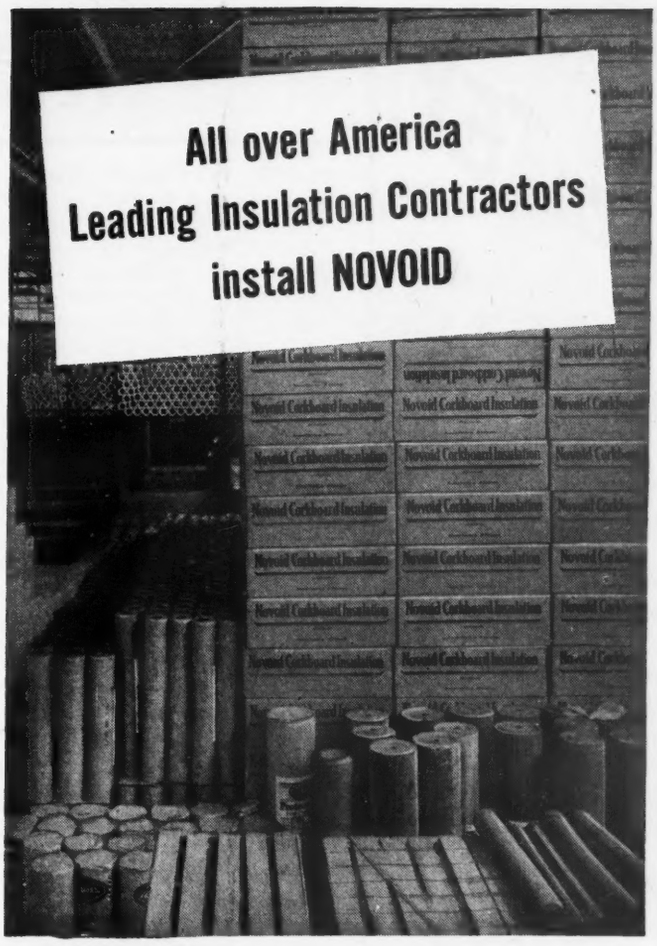
Indexes

Business Week's index of business activity was 144.0 for the week ending February 16, compared with 173.2 a month earlier and 227.5 a year ago.

Wholesale price index of foods compiled by the New York Journal of Commerce showed 110.4 for the week ending February 16. The monthly average for February, 1945, was 110.0.

CONSTRUCTION NEWS

	Pending (thousands)	Awarded February (thousands)	Total Awarded 1946 (thousands)
Bakery	$ 305	$ 95	$ 1,204
Beverages	2,780	2,805	6,172
Canning and Preserving	40	300	1,866
Cold Storage	465	587	1,520
Confectionery	...	50	150
Grain Mill Products	340	320	2,385
Ice Manufactured	...	200	200
Meats and Meat Products	220	...	40
Milk Products	210	1,155	2,825
Miscellaneous	2,521	916	2,945
	$6,881	$6,428	$19,307



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Novoid Covering is the moulded rigid insulation that efficiently reduces your cost of refrigeration. It snugly hugs pipes and fittings of every size and shape, does not sag, does not absorb moisture or odors, and is long-lasting.

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Will Not Crack or Peel

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Save their cost over and over again!

TOPMOST PROTECTION
Far greater safeguard to clothing than ordinary aprons!

AMAZING STRENGTH
Plus lightness in weight for utmost wearing comfort!

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PRICES — SIZES — COLORS

GRAY
27 x 36...$8.40 per doz.
30 x 36... 9.78 per doz.
36 x 40...11.90 per doz.
36 x 44...12.60 per doz.

Full Length Sleeves $9.66 per dozen pair

Leggings, Hip Length $11.90 per dozen pair

BLACK
27 x 36...$8.40 per doz.
30 x 36... 9.78 per doz.
36 x 40...11.90 per doz.
36 x 44...12.60 per doz.

Full Length Sleeves $9.66 per dozen pair

Leggings, Hip Length $11.90 per dozen pair

ALL WHITE
27 x 36...$6.88 per doz.
30 x 36... 7.65 per doz.
36 x 40... 9.35 per doz.
36 x 44...10.18 per doz.

Full Length Sleeves $7.15 per dozen pair

HEAVY DOUBLE COATED MAROON NEOPRENE
27 x 36..$10.61 per doz.
30 x 36.. 12.60 per doz.
36 x 40.. 16.50 per doz.
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Full Length Sleeves $12.90 per dozen pair

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All Prices F.O.B. Chicago. Furnish best priority. Minimum order 1 dozen.

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What Washington Thinks

By R. S. McBRIDE, Washington, D. C.

FLOUR VITAMINS—Much erroneous interpretation is given out in Washington on the subject of high extraction flour as it relates to vitamin content. Some of the comment is pure propaganda, attempting either to support or criticize the President's program. Career men, who have studied this matter, point out that enriched white flour has more vitamins and mineral nutrients than any flour of higher extraction from which the coarse irritating bran has been properly removed. Thus, the requirement of 80 percent extraction will not make unnecessary the addition of vitamins and iron to maintain flour at a high nutrient level.

BACK TO SCHOOL—American Bottlers of Carbonated Beverages have announced another series of short course schools in beverage production. Members of the staffs of companies in A.B.C.B. are offered a three week special training course that permits much more sound operation of the industry by key employees. The cooperation of established educational institutions in giving these courses insures both proper course content and presentation by those able to do a good job of teaching. The repeated demand from the industry proves that the benefit to employees sent at company expense is a good investment.

WHEAT SCARCITY—The shortage of wheat and the world food problem were not new when President Truman issued his nine-point program. They were only newly spotlighted by that action. The effect on food technology will be negligible except in wheat milling and a few features affecting bakers. The problem of dietetic readjustment will be much greater, for it has been established by experience in China, Britain, and elsewhere that 80 percent extraction of flour produces significant dietetic disturbance on a small percentage of the population. Official Washington will not admit that publicly, but does concede it privately. When it becomes evident to the public, there will be new pressure exerted to eliminate the high milling recoveries and white bread may return soon thereafter.

WHAT CONTROL?—The big controversy in Washington during February was really between those who believed in federal regulation and those who believed in control by natural laws like the law of supply and demand. Those following Chester Bowles are seeking a continuance of official regulation. Opponents like John Snyder and CPA leaders argue that abundant production will accomplish price control more effectively. Neither group will have full satisfaction; but apparently Congress intends that some natural control forces be restored as soon as feasible. Hence part of the artificial regulations may be cut out within the foreseeable future. The fact that this is an election year tends to speed up the return to a free competitive program, despite fear of inflation.

CAR SHORTAGE—Food technologists might as well face again the fact that car shortage will continue to be an important factor for some time in all technical planning, both for raw materials and for deliveries to customers.

BUDGET LEAK—In planning federal budgets, Washington hates to admit that there is one large leak of money from the Treasury cash drawer. With the end of the war, bond owners are cashing more bonds than they are buying in many areas. Privately, but not publicly, Treasury officials are wondering whether this may not deplete cash on hand seriously during the next year. If it does, there will be considerable delay in further tax reductions. If bond cashing can be postponed, Congress intends to make a further cut in personal income taxes before election, despite the President's statement that such action is not expedient. No one can really tell what will develop on these matters until early summer.

FREEZING DAMAGE—The loss of fruits and vegetables during the cold

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weather through freezing damage during transport or storage, again emphasizes that careless technology causes large loss to food industries as well as to the public. Despite freezing, the damage often can be minimized by proper precautions in handling and thawing. Government investigators point out that vegetables and fruit that have been frozen may be entirely usable if thawed at low temperatures (about 40 deg. F. rather than higher) unless rough handling has caused deep bruising while frozen. Technologists interested in details can get considerable aid on these subjects from the Bureau of Plant Industry.

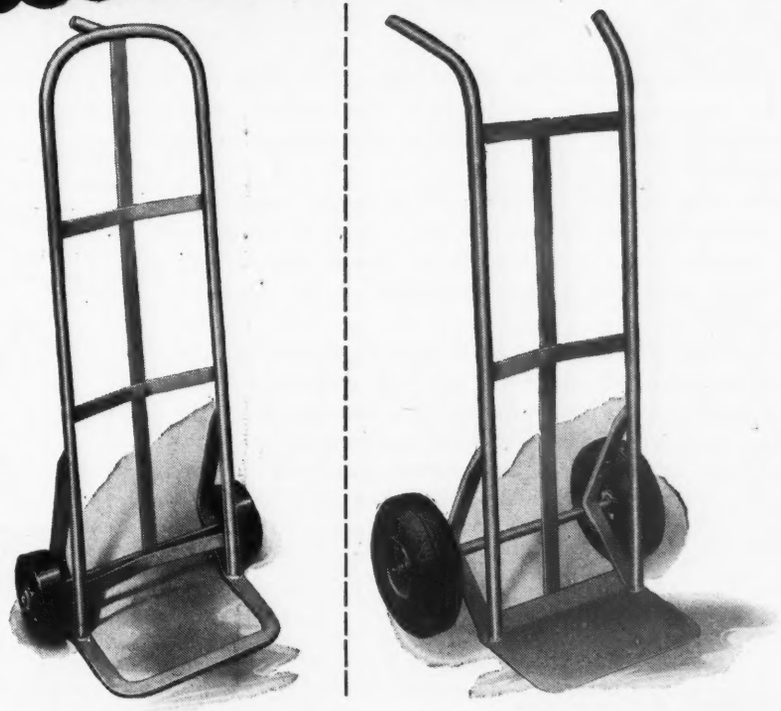
WASTE DISPOSAL—The federal budget message this year again emphasized the need for legislation to speed up Public Health Service studies in cooperation with states and industries for protection of waterways and abatement of stream pollution. The President directly indorses the plan of having federal funds, perhaps $100,000,000 per year, used for these purposes in the early future. Food plants with waste disposal problems that involve stream pollution can begin soon, their discussions with Public Health officials. They will then be ready to take a suitable part in actual projects when Congress finally acts. Some appropriations for these purposes this year would not surprise Washington, so time is short for preliminary studies.

IS IT INTERSTATE?—The Supreme Court, late in January, made another ruling that will help food producers in deciding whether their business is interstate or not. This unanimous decision of the Court came in the Roland Electrical Company case. In effect it said that local merchants like the corner grocer are not in interstate business; but those who make goods for commerce are, even though they appear to be operating almost or entirely within the boundaries of one State. From this it seems as though most of food processing is interstate commerce regardless of where it takes place.

COMPULSORY LICENSES—The patent question is often a political one in Washington. Lately, questions of forcing compulsory license of food patents has become something of an issue. The conservative National Patent Council has commented on this question in a very timely manner in the following language: "Compulsory licensing of foods and drugs exerts a powerful appeal to sentiment, but this proposal will not bear examination in the light of reason and experience. In this field, as in all others, the basic principles of the patent system apply. If we want progress we need the exclusive right of the patent grant to spur it on. To undermine the rights of a patentee in this field can have only the effect of slowing down progress. We have not yet so closely approached perfection and infinite wisdom that we can afford to slow down."

CASES, KEGS AND PACKAGES *can't walk*

but it's easy wheeling with a WHEEL-EZY



Cases, kegs and packages can't walk and you're wasting time, labor and money if you lug them about by hand. A Rapids-Standard *Wheel-Ezy* hand truck will give you *easy wheeling* with these bulky objects and will keep your handling costs low. Bottlers, brewers, distributors, super-markets and delivery men are finding increasing use for the Wheel-Ezy. There is a use for at least one in every plant. Strong, lightweight and perfectly balanced, Wheel-Ezy handles loads up to 500 pounds with ease. "Step-Climber" feature makes it possible to go up and down steps in easy fashion. Now available in one and two handled models, open or solid plate nose. Write for literature and price lists — no obligation.

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AGH—Demountable Cushion rubber wheels . . . it's *tough*. MOCH—Moulded on Cushion Rubber Wheels, moulded to metal core. ABK—Plastic wheel with laminated fabric tread, moulded under heat and pressure. MRK—Resinoid Wheels made of sturdy canvas duck, macerated and moulded under heat and pressure. Plain or Roller Bearings. NICRO STEEL—Fine quality grain castings, fully machined. Oilite Bearings, zerk lubrication. GP—General Pneumatic with 10" x 3.50" demountable rubber tires.

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The answer is YES, if you need faster "come up" time, you want this new Taylor No. 2B Retort Control System!

HERE is a new Taylor Retort Control System for processing glass packages with standard caps or tin containers in water that cuts "come-up time" to five minutes or even less!

Think what this means. It means if you are running, say 10 batches per retort a day, and you cut a 10 minute come-up time to 5 minutes, you have time to run an extra retort load in the day's cycle! *A 10% increase in output!*

Over-cooking is a hazard of long coming-up periods since cooking schedules are laid out without regard to length of coming-up or cooling periods. The 2B System reduces possibilities of over-cooking to a minimum. It's a substantial refinement of the Taylor 2A Retort Control System which has had such enthusiastic acceptance for so many years. Its major innovation is the use of staggered valves in the steam line. By staggering a 1½" with a ½", steam valve maintenance is cut to a minimum. And you get positive and assured circulation during the cooking period.

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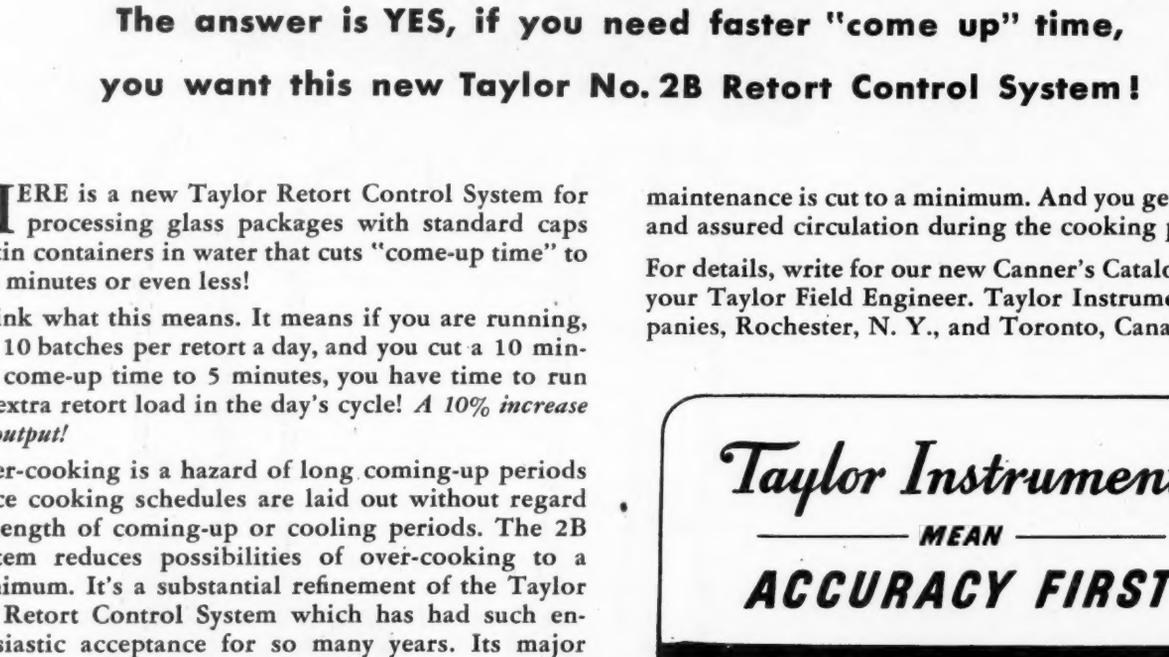

MEN • JOBS • COMPANIES

INDUSTRY

American Home Foods, Inc., has announced that with its acquisition of Chef Boy-Ar-Dee Quality Foods, Inc., total sales during 1946 will be well over $50,000,000. The Milton, Pa., company will be the fifth food division for American Home Foods.

Blair and Co., Inc., has acquired the Pepsi-Cola Bottling Co. of Los Angeles, in its first venture into Southern California industry.

Blue Moon Foods, Inc., Thorp, Wis., through its president, Jason F. Whitney, has announced the establishment of a new manufacturing plant in East St. Louis, Ill. Herman F. Laabs, who has been identified with the food industries for many years, will be general manager.

Carnation Milk Co. has completed plans for a new $1,000,000 plant to be erected in Houston, Texas.

Christian and Co., Inc., Pittsburgh, Pa., who produced more than 52,000,000 lb. of canned boneless chicken and turkey for the Armed Forces, recently completed its plant reconversion program and is in full production of its civilian line of poultry products.

Citrus Concentrates, Inc., Dunedin, Fla., whose main plant was destroyed in a $2,500,000 blaze last August, has completed plans for rebuilding and expects to be operating during the next canning season beginning about November 1.

Del Ray Cooperative Winery, owned by Del Ray Cooperative Winery Association of the San Joaquin Valley, Calif., has begun construction of a new $500,000 winery near Fowler, Calif.

The Doughnut Corp. of America, Chicago, has purchased a site in that city on which it plans to erect a 3-story building for the consolidation of its organization in the Middle West. The new structure will carry offices, warehouse and production facilities.

General Seafoods Corp., Division of General Foods Corp., has announced the acquisition of the plant and facilities of Snow Shipyards, Inc., Rockland, Maine. Operation of the yards will be expanded and construction of a fish processing and freezing plant soon will be under way. J. Lawrence Alphen, president of General Seafoods, estimates that the expansion will represent an investment in excess of $1,000,000.

Kroger Grocery & Baking Co. has sold its meat packing plant at Scottsbluff, Neb., to Daniel Ramsey and John Cook, Jr., of that city. The sale puts into effect the company's announced policy to withdraw from the packing business.

DR. JAMES R. WILSON

Having accepted an invitation to become secretary to the Council on Foods and Nutrition of the American Medical Association, Dr. James R. Wilson has been granted a leave of absence from the College of Medicine, Syracuse University.

COL. ROHLAND A. ISKER

Commanding Officer of the Subsistence Research and Development Laboratory since August, 1939, Col. Rohland A. Isker leaves the Army on March 15 to establish a food advertising agency with Miss Frances Hooper.

Leaf Gum Co., Chicago, recently purchased the building formerly occupied by Minneapolis-Honeywell Co. in that city.

National Milling Co. is building a 2,000,000-bu. grain elevator at its Toledo, Ohio, plant. Scheduled for completion next fall, the addition will cost approximately $600,000 and will increase the company's elevator capacity to more than 6,000,000 bushels.

Pacific Fruit Express Co. through its joint owners, Southern Pacific and Union Pacific Railroads, has announced the authorization for purchase of 2,000 new railroad refrigerator cars at a cost of about $12,000,000.

Petri Wine Co., San Francisco, has made the statement that California wine makers are in the war-born cream of tartar business to stay. The Petri Co. recently invested $50,000 in special equipment to recover tartrates from grape skins.

Ralston-Purina Co., St. Louis, Mo., has expanded its cereal research program by establishing additional laboratories and an experimental plant to carry on laboratory recommendations. A recently purchased 4-story building in St. Louis is being remodeled at a cost of $250,000 and is scheduled for completion soon. Virgil O. Wodicka will be in charge of the cereal research laboratories.

Rice Growers Association of California is building a $125,000 rice processing plant in Yolo, near West Sacramento, Calif.

Wisconsin Alumni Research Foundation, Madison, Wis., has acquired a site with plans for future construction of two new buildings to house a laboratory for continuance of control work in the testing of vitamins and other products.

PERSONNEL

Paul L. Beach has resigned as chief chemist for the Edgar F. Hurff Co., Swedesboro, N. J., to enter food consulting work in Wisconsin.

Perry L. Bidstrup has been appointed to the technical staff of the Midwest Research Institute, Kansas City, Mo.

E. A. Blish has been named president of the Blish Milling Co., Seymour, Ind., succeeding the late John L. Blish.

Charles G. Boone, superintendent of the Pennsylvania Salt Manufacturing Co. plant at Natrona, Pa., has retired after 21 years as head of Pennsalt's Natrona operations.

Woodrow W. Bralley has been appointed technologist in charge of quality control for John H. Dulany & Son, Exmore, Va.

Thomas R. Coyne, recently released from the Armed Services, has been

★ A clean interior for food and chemical products — cover sealed air tight preserves freshness and purity — sturdy construction resists rough handling and eliminates losses through leakage or contamination. Other Inland Steel containers range from 3-gallon to 55-gallon capacities with a wide variety of spout openings and cover styles suitable to any liquid or semi-solid products.

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PLANTS AT: CHICAGO — JERSEY CITY — NEW ORLEANS

elected treasurer of the B. A. Eckhart Milling Co., Chicago.

Joseph Cryns, former bakery engineer for the Quartermaster Subsistence Research and Development Laboratory, Chicago, has joined the staff of Rosen's Bakeries, Cleveland, Ohio, as production manager.

Dr. G. M. Dack, formerly associate professor of bacteriology, University of Chicago, has been appointed professor of bacteriology. He has also been named director of the Food Research Institute at the University.

Frank J. Enos has been named a director of the R. T. French Co., Rochester, N. Y. He joined the firm in 1922 and since has served in its Philadelphia and San Francisco branches.

Dr. Robert S. Goodhart, since 1943 chief of the Industrial Feeding Program Div., War Food Administration, has been appointed scientific director of the Institute for Vitamin Research, Inc., New York. Dr. Goodhart recently returned from Japan where he studied nutritional problems of the Japanese people.

Ray Kueneman, formerly with the Fruit and Vegetable Products Branch of the Quartermaster Subsistence Research and Development Laboratory, Chicago, has joined the J. R. Simplot Dehydrating Co., Caldwell, Idaho.

Nate Lipton has been appointed assistant general production manager of the Flavor Service Corp., Chicago, manufacturer of dehydrated soups and seasonings. Mr. Lipton will assume his duties in a newly opened processing plant in Chicago.

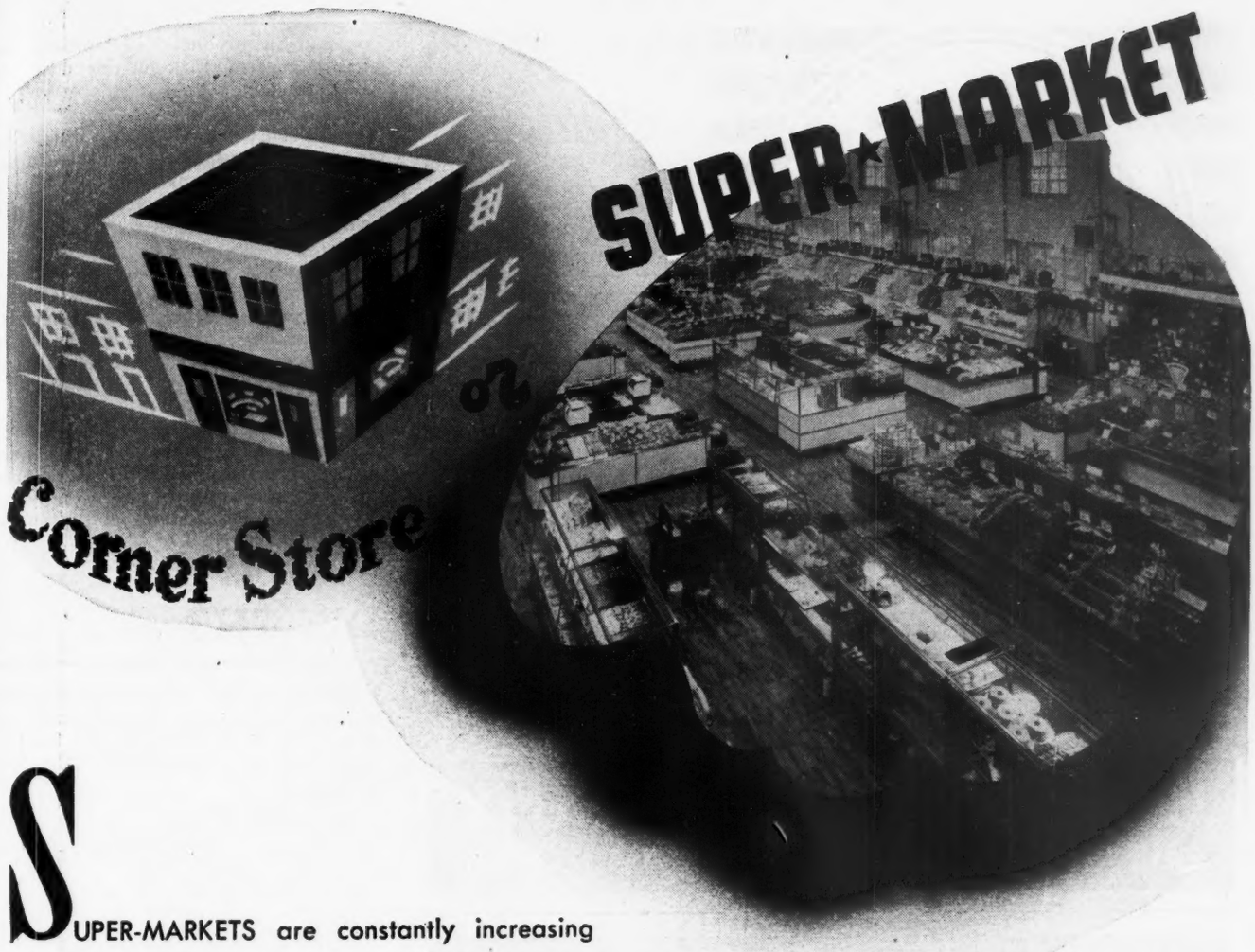
J. Grayson Luttrell, vice-president of McCormick & Co., Baltimore, recently was elected vice-president of the Tea Association of the United States. He also is serving his ninth consecutive year as a member of the Board of Tea Experts of the United States Government.

Leon A. Miller, personnel director since 1942, has been named plant manager of the Post Products Division of General Foods Corp. He succeeds the late Stanley H. Zimmerman.

Richard A. Norris has been elected secretary of the Cudahy Packing Co., Chicago, succeeding the late J. F. Gearen, Jr.

R. T. Prescott has resigned his position as manager of Western Regional Research Laboratories to become associated with H. C. Diehl in the Refrigeration Research Foundation, Berkeley, Calif.

Lt. Robert Remaley, formerly with the Dairy Products Branch of the Quartermasters Research and Development Laboratories, Chicago, has joined Kraft Foods Co., Chicago, where he will be



SUPER-MARKETS are constantly increasing in popularity because the housewife finds everything she needs under one roof. It's a one-stop job that always saves time, and often saves money.

Like a balanced meal, packaging also requires careful shopping for many different materials. Each individual product must have exactly the right combination of appearance, protection, production efficiency and economy.

Riegel, many years ago a "corner store" with only a few highly technical papers, is now the largest "Super-Market" for printing, industrial and special packaging papers. They range from a 16 lb. glassine to a 400 lb. pattern paper, and the service we render is highly individual . . . adapting our papers to your needs.

Why not accomplish your objectives the "one-stop" Riegel way?

600 RIEGEL *Papers*

The Riegel sample files contain more than 600 different grades—a gold mine for the paper buyer who wants the best possible combination of protection, production efficiency and economy, to meet his own individual requirements.

We make glassine, greaseproof, sulphite, wet-strength—printed, embossed, resin-impregnated, laminated, oiled, lacquer-coated, waxed, dry-waxed—packaging papers, converting papers, printing papers and industrial papers in endless variety.

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Sealtight
THE HEAT SEALING MACHINE THAT HAS STOOD THE TEST OF TIME

Heat Seal-It Company, pioneers and original producers of bag heat sealing equipment, now offer their new and improved line of "Pacer" Models. The result of 13 years experience exclusively in this field, there is a Sealtight machine for every purpose. Write for our general catalog, illustrating all models with complete information.

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HEAT SEAL-IT COMPANY
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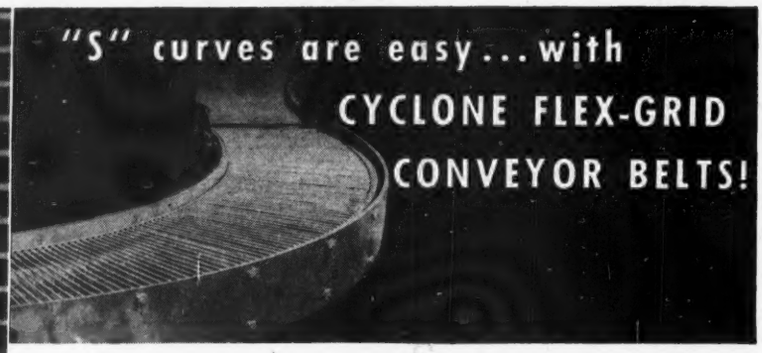
"S" curves are easy... with CYCLONE FLEX-GRID CONVEYOR BELTS!



CYCLONE'S FLEX-GRID METAL CONVEYOR BELT is ideal for the continuous processing of baked goods, and of frozen fruits and vegetables such as apples, apricots, peaches, tomatoes, kohlrabi and head lettuce. Particles do not readily adhere to the smooth, round wires, which may be easily cleaned of clinging juices. Where turntable operation is desired, Cyclone's Multi-Pitch Flex-Grid will give efficient service. The use of sprockets permits a positive drive, free from slippage and belt stretch.

You can depend on Cyclone quality. It is based on 25 years' experience in making metal conveyor belts for industry. Cyclone engineers will gladly consult with you on conveyor belt problems. Offices in principal cities . . . factories in Middle West and on Pacific Coast. Write for *free* catalog No. 3.

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(AMERICAN STEEL & WIRE COMPANY)
Dept. H-36, Waukegan, Illinois
United States Steel Export Company, New York

UNITED STATES STEEL

engaged in product development and quality control work on dry milk and allied products.

Theo Sachs, president of Blue Star Foods, Rockford, Ill., was elected president of the National Potato Chip Institute at its recent convention in Detroit.

Maj. William A. Scott, chief of the Buying and Production Branch, Chicago Quartermaster Depot, has resumed reserve status and is organizing a Chicago company to manufacture potato products and other specialties.

Edward Seltzer, formerly head of process engineering research for General Foods Corp., has resigned to become chief research engineer of Continental Foods, Inc., a subsidiary of Lipton Tea Co., Hoboken, N. J.

DEATHS

Hugo F. Arnold, 72, former president of Arnold Brothers, Inc., Chicago, and president of the Packers and Sausage Manufacturers' Association of Chicago, January 2.

L. A. Black, former president of the National Rice Millers' Association, Dewitt, Ark, recently.

Charles J. Carney, 57, head purchasing agent for Cudahy Packing Co., Chicago, January 23.

B. W. Carrington, 69, chairman of the board of Morton Salt Co., Chicago, January 30.

Walter L. Cherry, 72, chairman of the executive committee, one of the founders and first president of Cherry-Burrell Corp., Chicago, February 5.

James M. Freeman, 78, owner and manager of Paris Milling Co., Paris, Tenn., recently.

J. H. Friedel, 54, retired president of Mayflower Doughnut Corp. and vice-president of Doughnut Corporation of America, January 21, Beverly Hills, Calif.

Robert Friend, 68, vice-president of Friend Bros., Melrose, Mass., January 9.

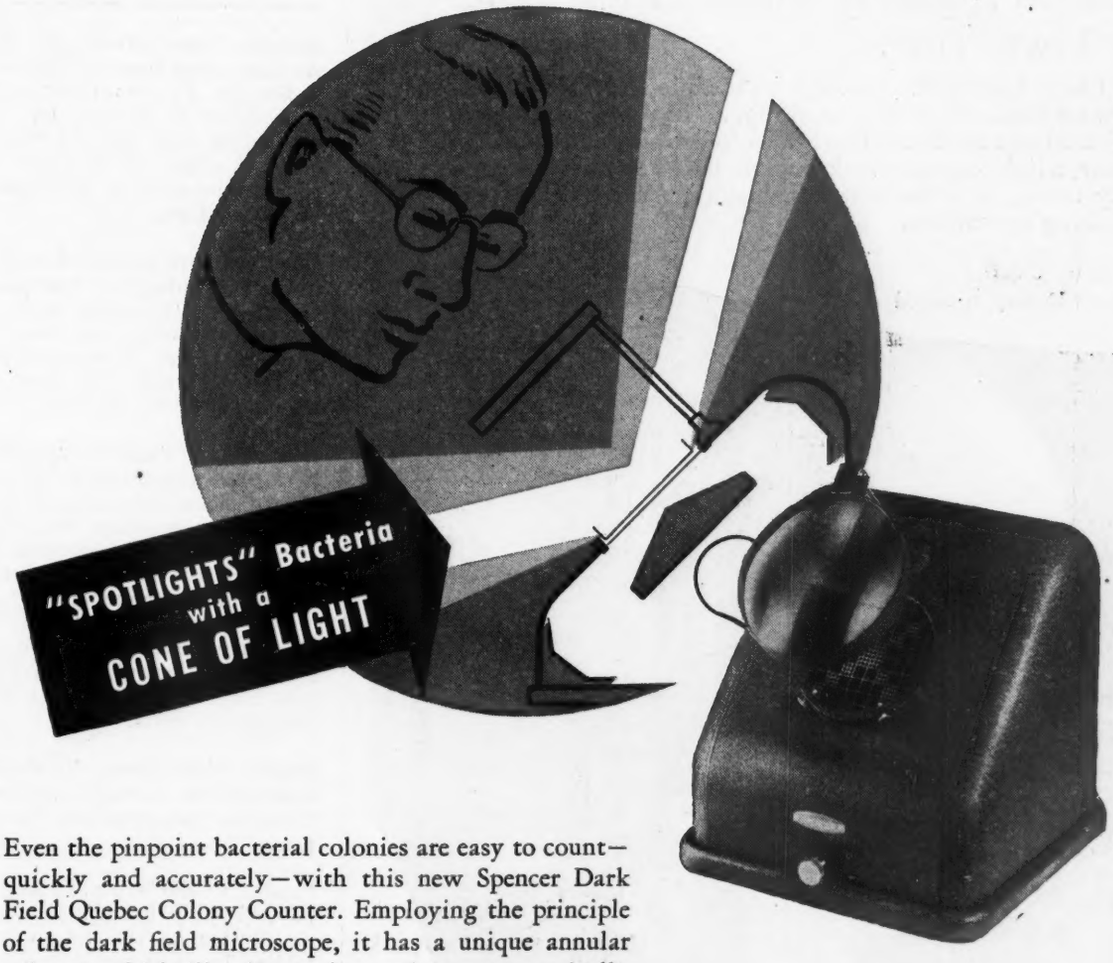
Enoch L. Griffith, 80, chairman of the board and founder of Griffith Laboratories, Chicago, January 30.

Levin Phillips, 44, president of Phillips Brothers, Baltimore, Md., recently.

Joseph A. Walter, president of Walter Milling Co., Buffalo, N. Y., January 15.

Herbert J. Webber, 80, director emeritus of the University of California

NEW SPENCER COLONY COUNTER



Even the pinpoint bacterial colonies are easy to count—quickly and accurately—with this new Spencer Dark Field Quebec Colony Counter. Employing the principle of the dark field microscope, it has a unique annular reflector which illuminates the specimen symmetrically with oblique rays of light and leaves the background subdued. As a result it provides:

1. **Remarkably uniform illumination**—the colonies are lighted from all sides.

2. **Greater brilliance**—reflector collects and concentrates the light rays.

3. **Freedom from glare**—only light reflected from the specimen reaches the eyes of the observer.

4. **Enclosed illuminating system**—protected from dust, yet permitting easy replacement of the household 40 watt lamp.

Equipped with a standard 1.5x lens, this compact, efficient instrument will be welcomed by health departments, hospitals, dairies, breweries, canneries—wherever colony counts are made. Write dept. C49 for details.

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COMPANY
Scientific Instrument Division
Buffalo 15, New York

Manufacturers of the **SPENCER** *Scientific Instruments*

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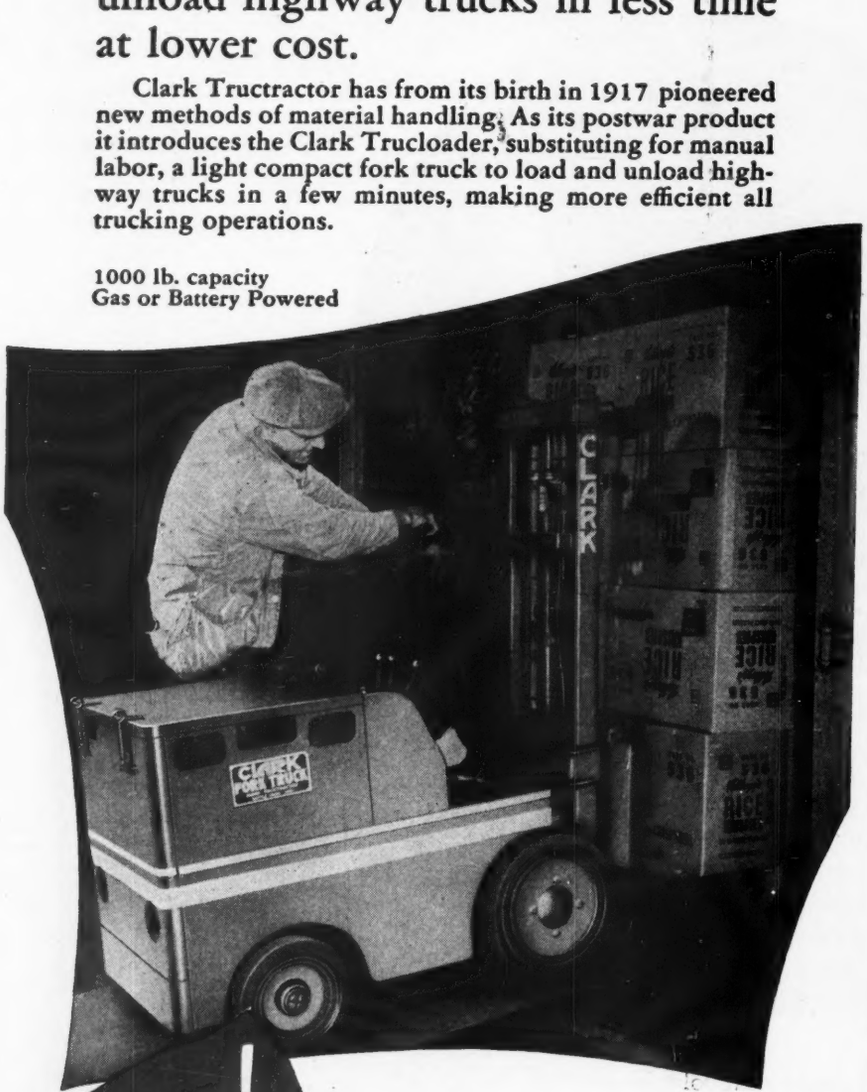
A NEW METHOD... A NEW VEHICLE

A unique fork truck to load and unload highway trucks in less time at lower cost.

Clark Tructractor has from its birth in 1917 pioneered new methods of material handling. As its postwar product it introduces the Clark Trucloader, substituting for manual labor, a light compact fork truck to load and unload highway trucks in a few minutes, making more efficient all trucking operations.

1000 lb. capacity
Gas or Battery Powered



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Another PRODUCT of CLARK EQUIPMENT COMPANY

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CLARK TRUCTRACTOR DIVISION
BATTLE CREEK, MICHIGAN

Products of CLARK • TRANSMISSIONS • ELECTRIC STEEL CASTINGS
AXLES FOR TRUCKS AND BUSES • AXLE HOUSINGS • BLIND RIVETS
INDUSTRIAL TRUCKS AND TRACTORS • HIGH-SPEED DRILLS AND REAMERS
METAL SPOKE WHEELS • GEARS AND FORGINGS • RAILWAY TRUCKS

Citrus Station, Riverside, Calif., January 19.

Wilson L. Young, 90, former partner in the firm of Young and Young, Fillmore, N. Y., recently.

ASSOCIATED INDUSTRIES

Durabla Manufacturing Co. has moved its valve plant from the former location in Berwyn, Pa., to a newly reconstructed building at Wayne, Pa. Besides a production area, the new plant will include an office and facilities for carrying on a program of development work in valve design.

Firestone Tire and Rubber Co., Akron, Ohio, has announced the appointment of Roger S. Firestone as manager of the new products department. He will be in charge of all research and development involving new products to be manufactured by the firm.

International Plastic Corp., Morristown, N. J., has appointed A. Edwin Philips vice-president in charge of marketing. In his new capacity, Mr. Philips will direct sales and marketing for cellulosic, printed, metal and paper tape divisions of the company.

Marathon Corp., Menasha, Wis., has announced the completion of plans for a new building to house its carton and folding box units.

Mundet Cork Corp., Brooklyn, N. Y., recently has elected Gervase M. Magrum as vice-president in charge of production.

Paisley Products Inc., Chicago, has appointed Skilly T. Knox as a special representative to the set-up paper box, folding box and paper converting field. Mr. Knox, formerly assistant sales manager of the coated boxboard division of Container Corp. of America, will cover the middle western territory for Paisley Products.

Westinghouse Electric Corp. recently announced the election of Gwilym A. Price as president, succeeding George H. Bucher, who resigned. Under the Corporation's new by-laws, the president will act as the chief executive officer. A. W. Robertson, chairman of the board and chief executive officer since 1929, has reached retirement age, and upon his re-election, will carry on for the company in a less active capacity.

Winthrop Chemical Co., Inc., has made known the appointment of Dr. Reginald C. Sherwood to the newly created position of technical director of the special markets division. Dr. Sherwood formerly was vice-president of the special commodities division of General Mills, Inc.

FOOD EQUIPMENT NEWS

Push-Pull Truck

AUTOMATIC TRANSPORTATION CO., Dept. I, 101 W. 87th St., Chicago 20, has added to their line a push-pull "Transtractor" into which is embodied all the standard-drive features contained in their pallet- and platform-type trucks. The front wheel drive is said to furnish constant maneuverability in close quarters. The forward and reverse drive controls are pushbutton operated from the guide handle. Raising and lowering of the guide handle controls two forward and two reverse speeds. Drive brakes are applied with the return of a guide handle to an upright position. The steering turntable is ball-bearing mounted. The front wheel drive has a double reduction chain drive from the series-type motor.

It has a heavy-duty bumper plate. Standard equipment includes a battery of sufficient capacity to supply adequate daily power for eight to ten hours of operation.

Push-pull trucks.

Waterproof Bag

BEMIS BRO. BAG CO., Dept. I, 409 Pine St., St. Louis 2, Mo., is offering a waterproof paper-lined textile bag designed for non-fat milk solids. It was developed in cooperation with American Dry Milk Institute, Chicago, and is said to have been approved by that organization. It is for use in storing and shipping powdered milk for human consumption.

The bag is made by laminating a sheet of cotton or burlap with two sheets of heavy-creped kraft paper. Each ply is firmly cemented to the next with a waterproof adhesive. Instead of making the bags with the conventional sewn seams, cemented seams are used to give the complete protection which is required. As an extra barrier against moisture, an all-way stretch paper liner is inserted in the bag. The bags are closed, either by a double-wire tie or by heat-sealing plastic-coated textile tape closure.

Insecticide Bomb

BRIDGEPORT BRASS CO., Dept. I, Bridgeport, Conn., announces an insecticide bomb containing 2 percent of 20 percent pyrethrum extract for "knock-out" effect on insects and 3 percent DDT to assist in the final kill. These active ingredients are dissolved in a naphthalene solution and the entire mixture is combined with non-inflammable liquefied Freon gas which acts as a propelling force. This formula was developed by the U. S. Department of Agriculture.

When used in accordance with instructions this concentration is reported to offer no health hazard. When properly used it is said to be satisfactory for use in food plants, canneries, food processing plants dairies, bakeries, etc.

The container is safely constructed in accordance with Interstate Commerce Commission Specification No. 9. A valve provides a uniform rate of flow in order that an economical and yet effective quantity of insecticide can be delivered. For mosquitoes, flies and gnats a 6 to 8 second spray is sufficient. The bomb is refillable.

Insecticide bomb.

Internally Plated Pipe

STEEL PIPE, internally electroplated with nickel or other metals, has been commercially developed by Bart Manufacturing Co., Dept. I, 227 Main St., Belleville 9, N. J. The process is said to develop a smooth, ductile, pore-free nickel deposit fully adherent to the base metal. It can be applied to pipe or tubing up to an 18-in. overall diameter and in random lengths of approximately 20 ft. Fittings and accessories are available for complete piping systems.

The manufacturer states that the pipe can be welded, reduced and bent, hot or cold, without destroying any portion of the lining. In the cold reduction process, both the base metal and the internal coating reduce in equal ratio. This makes it possible to predetermine the actual thickness of the plating throughout the entire reduction.

The cost of this "Lectro-Clad" piping is said to be only a fraction of the cost of corrosion-resistant pipe.

Thermostats

THERMOSTATS with adjustable calibrated dials are announced by Paul Henry Co., Dept. I, 2037 S. La Cienga, Los Angeles 34, Calif. Tamperproof dial installation, preventing changing of adjustable range, can be provided at the factory. Adjustable ranges are available between —50 deg. and +600 deg. F., with differentials as low as one degree F. The unit may be clamped on the tank or it may be immersed in water.

Vi-Co

NATURAL "B" COMPLEX
YEAST VITAMIN PRODUCTS
AND YEAST DERIVATIVES

Plasmolyzed Yeast Extracts
for FOOD and AMINO ACID
PREPARATIONS

Vi-Co Plasmolyzed Yeast Extracts are prepared by enzyme digestion of brewers' yeast to yield a B complex product rich in essential amino acids. Amino acids provide the necessary "building blocks" for healthier and stronger bodies.

These products possess a definite "meat-like" flavor useful in enriching soups, bouillon cubes, tomato juice and other packaged foods. Such enriched foods are also of value for their natural B complex and high amino acid composition.

Consult us about your vitamin or yeast problems. Our technical staff can best advise you how Vi-Co products can be used to enrich your own products.

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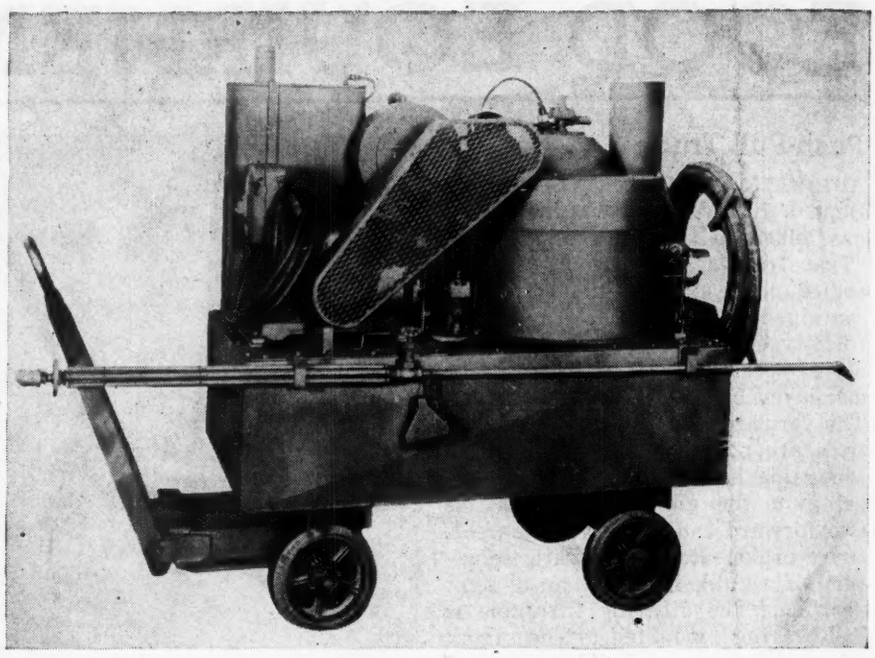


Oil-fired steam cleaning unit.

Steam Cleaning Unit

A SELF-CONTAINED, down-draft flame, oil-fired, steam cleaning unit has been developed by Oakite Products, Inc., Dept. I, 26G Thames St., New York 6. It includes an inclosed coil-type steam generator that delivers hot vaporized cleaning solutions under selective pressures up to 200 lb.

It is said to easily remove grease, grit, grime, paint and other deposits from surfaces. Several types of fuel oils, kerosene or gasoline may be used to operate the unit.

Non-Corrosive Rust Remover

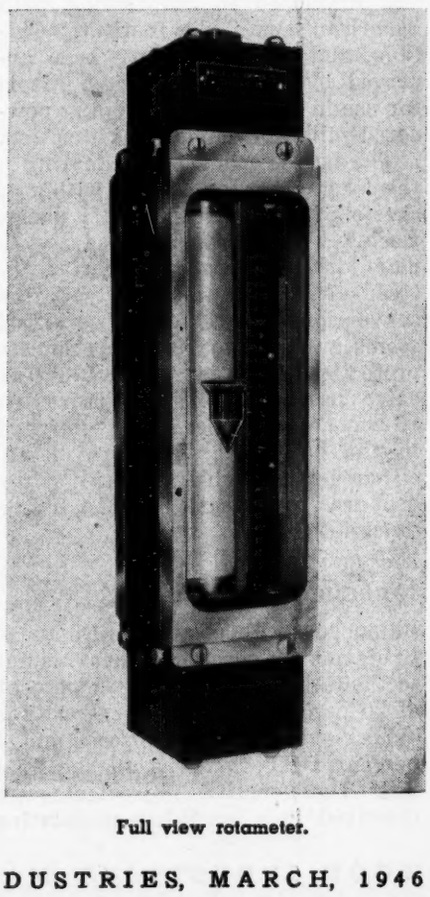
NOX-RUST CHEMICAL CORP., Dept. I, Chicago 8, Ill., has placed on the market a rust remover that is said to wet metal thoroughly, dissolve rust scale rapidly and remove it completely. It is claimed to be relatively non-corrosive to steel, even under conditions of long exposure. It can be applied to equipment with a brush or by spraying or dipping. In inaccessible crevices the material is said to penetrate and give satisfactory results.

Soapless Cleaner

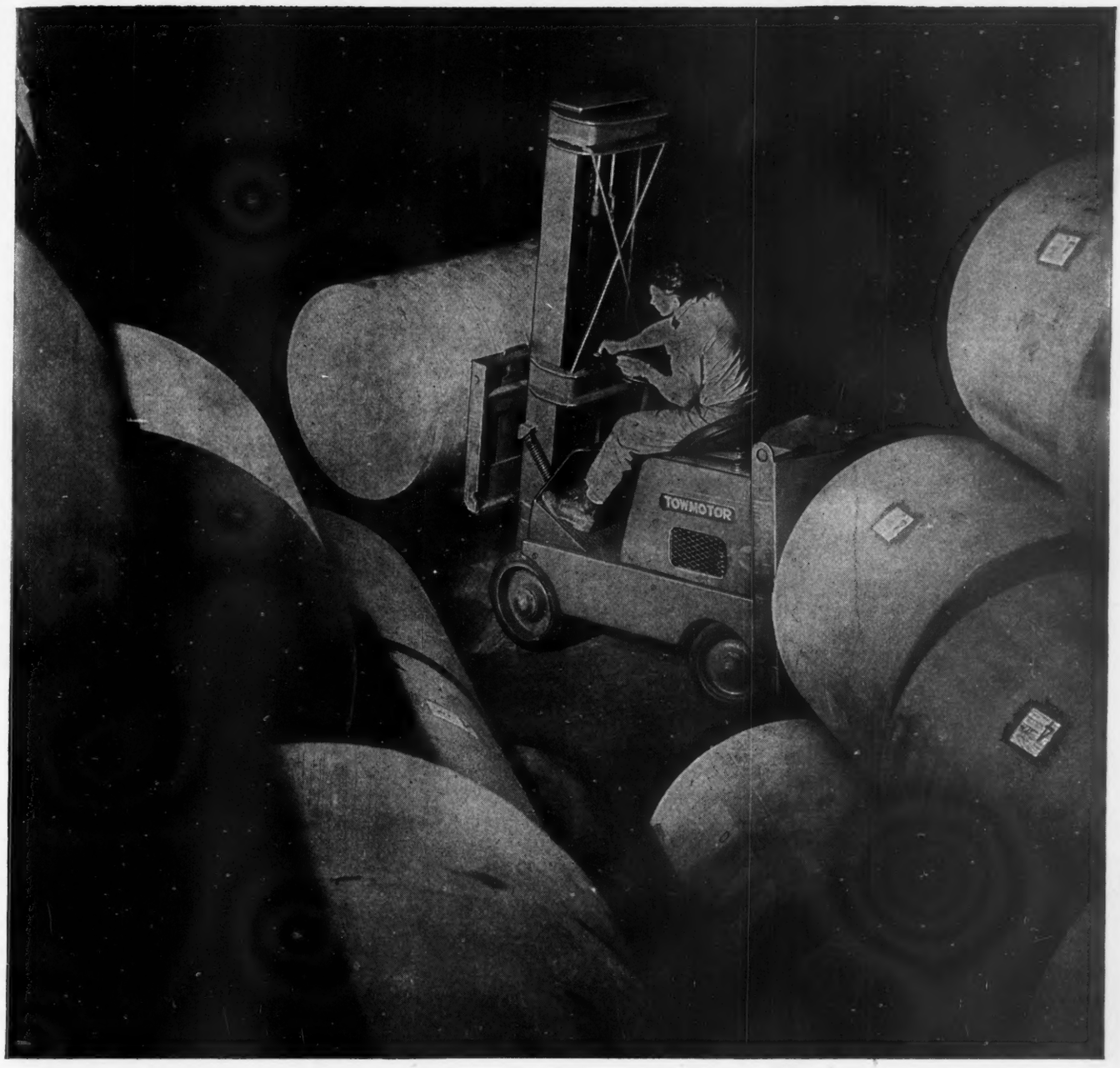
AN all-purpose soapless cleaner that is said to produce suds instantly in hard, soft or sea water—and to effectively clean everything from delicate hosiery and woolen to grease-caked heavy machinery—has been placed on the market by K. P. Chemical Co., Dept. I, 16 W. 46th St., New York. It is available in powder form in 50-lb. cartons and 350-lb. drums. The cleaner is said to contain no abrasive and is entirely soluble. The company states that it is ideally suited for cleaning equipment in every branch of the food industry.

Rotameter

BROOKS ROTAMETER CO., Dept. I, P. O. Box B-1231, Lansdale, Pa., announces a full-view Rotameter with safety



Full view rotameter.



RAISING WAGES TO LOWER COSTS

IN THE COURSE of expanding their Cleveland plant facilities The Hinde & Dauch Paper Company, manufacturers of corrugated boxes, turned twenty-seven years of Towmotor materials handling experience and "know-how" to their own fullest advantage. As a result, Hinde & Dauch improved their method of handling large, bulky rolls of fibre board by installing a Towmotored handling system.

In addition to solving their handling equipment problem Hinde & Dauch achieved another important improvement. Because of the new system one man operating a Towmotor unloads, transports, stacks and delivers rolls weighing 1500 lbs. to 4,000 lbs. each, totalling 90 tons per day. Since he is paid on a tonnage basis the Towmotor operator actually earns more money than under the previous method although the cost of handling has been appreciably reduced. This "pay increase" is possible because flexible Towmotor can transport and stack 3 to 6 foot long rolls anywhere in the plant without extra manual handling. In many of the other Hinde & Dauch plants throughout the country the Towmotor method has already been adopted.

For every handling problem there is an engineered solution .... a solution based upon Towmotor experience and "know-how" gained in solving handling problems in every industry. Send for your copy of the Towmotor Lift Truck ANALYSIS GUIDE today. Towmotor Corporation, 1222 E. 152nd St., Cleveland 10, Ohio.

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THE ONE-MAN-GANG

Economize WITH POWERS

TEMPERATURE REGULATORS

Use a Powers No. 11 Temperature Indicating Regulator when you want the advantages of an easy-to-read dial thermometer combined with a dependable self-operating regulator. The dial thermometer gives a visual check on the performance of the regulator and makes it easy to adjust for the required operating temperature. Various dials and ranges are available.

Is Easy To Install—because both the thermometer and the regulator operate from the same thermal system—only one tapped opening is required.

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OVER 50 YEARS
OF AUTOMATIC TEMPERATURE AND HUMIDITY CONTROL

shielding for accurate flow rate measurement and control.

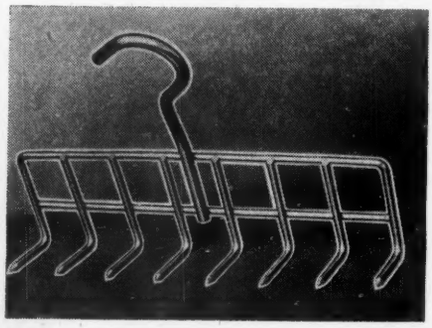
The design is based on simple, square block end fittings, fastened together rigidly by heavy flat side plates. Safety glass windows ¼ in. thick are held in place by stainless steel window frames 3/32 in. thick. It is equipped with an interchangeable precision metering tube.

The float position can be easily and accurately read from any angle. All parts are treated to prevent external corrosion.

The meter is available in sizes from ⅛ in. to 4 in. with screwed or flanged connections. It can be used for pressures up to 600 lb. per sq. in. It can be obtained either as an indicator or with remote instrument for recording or recording-controlling flow rate.

Bacon Hook

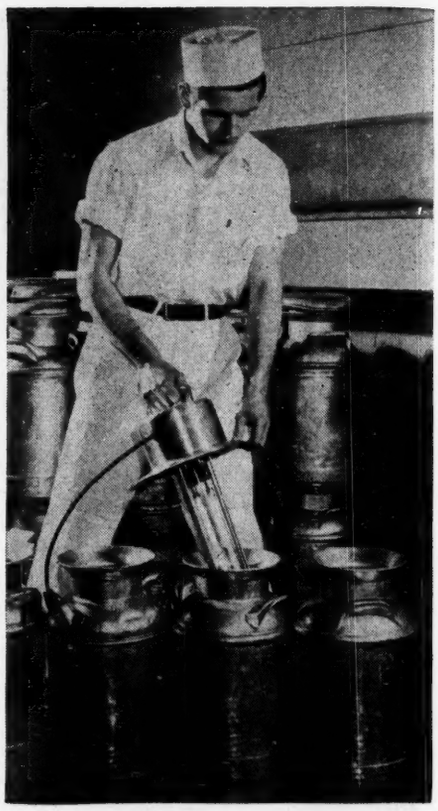
PERFECT balance is said to be built into this sturdily constructed bacon hook by means of an extra-heavy reinforcement bar causing even hanging of the bellies. This hook, made by Basic Food Materials, Inc., Dept. I, 806 Broadway, Cleveland 15, Ohio, is fabricated of tough, carbon-steel rod and strongly welded to provide uniform strength. The hook has sharp smooth points, and is given three coats of special plating—copper, nickel and chrome—which provide a smooth nonporous finish that is said to leave no mark on the bacon. This also eliminates the need for future replating. The hooks are available with 8 or 10 points. Other sizes may be had on request.



Smoking bacon hooks.

Fork Truck

A 2-TON fork truck is announced by the Baker-Raulang Co., Dept. I, 2168 W. 25th St., Cleveland 13, Ohio. It is said to incorporate features which permit the operator to "articulate" the frame, permitting swinging the load to position without lining up the truck itself. This feature is said to require about 3 ft. less aisle space for placing loads at right angles to aisles.



U-shape sterilamp.

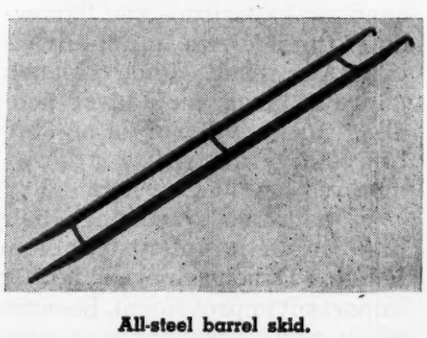
Sterilamp

ULTRAVIOLET RAYS produced by a U-shape Sterilamp, developed by Westinghouse Lamp Division, Dept. I, Bloomfield, N. J., is said to reduce the bacteria count in washed milk cans by 96 percent in one minute exposure.

The lamp with its special fixture is shown being inserted into a can prior to filling. The tube which consumes less electricity than a 25-watt electric light bulb is suspended on springs inside a protective steel cage.

Barrel Skid

AN all-steel barrel skid has been designed and built by Palmer-Shile Co., Dept. I, 7181 W. Jefferson Ave., Detroit 17, Mich. It is said to be much lighter in weight, yet substantially stronger than the older type. A skid 14 in. wide and 8 ft. long weighs 45 lbs. It is of all-welded construction.



All-steel barrel skid.

The responsibility of delivering a product to the consumer in perfect condition belongs to the package. For this reason Milprint maintains a complete laboratory, staffed by graduate chemists who constantly subject new and old materials to every known test. Laminations, Coatings, Thermoplastics, Papers, Foils, and many new applications — are proven in the laboratory before they find themselves in your package! This sense of responsibility for *maximum* protection of your product is always an integral part of your Milprint package.

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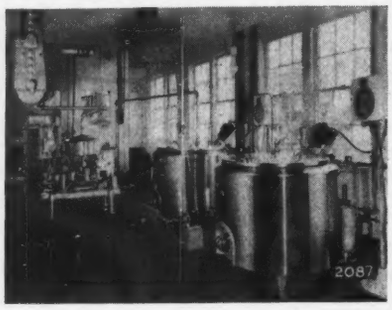
Reco RADI-AIRE
CIRCULATOR



FOR PROCESSING ROOMS

Hundreds of processing rooms are securing gentle, complete, uniform air circulation and uniform relative humidity throughout the room by means of RECO RADI-AIRE Circulators. As a result, walls and ceilings are dry. Steam, fog and odors are eliminated. All products are processed under uniform conditions. No drafts. Quiet operation.

The RECO blows upwards, the air traveling along the ceiling, down the wals and up the center again. As a result there are no dead air spaces. Operators' hands keep dry. Has year around use as it is exceptionlly efficient in hot weather for body comfort cooling.

Made in ceiling, low stand and pedestal types in various sizes. Please write for prices and descriptive literature.

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Mfr. of Refrigerator Fans, Processing Room Fans, Heat Circulators, Food Mixers, Veg. Peelers, Chopper-Slicers.

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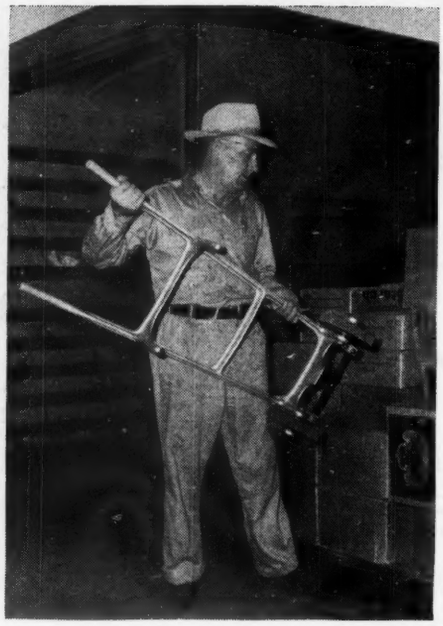


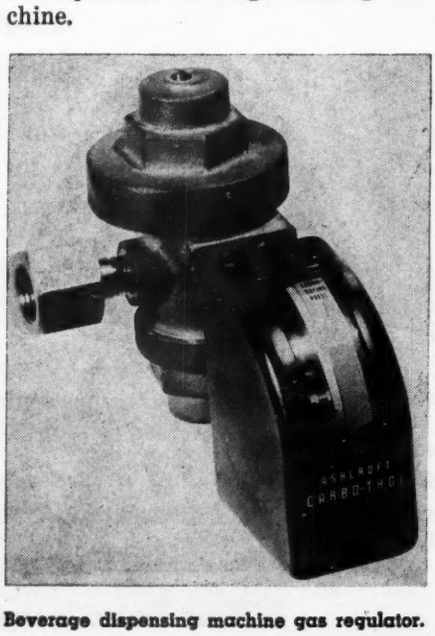
Aluminum hand truck.

Aluminum Hand Truck

NORTHROP AIRCRAFT, INC., Dept. I, Hawthorne, Calif., has built an aluminum hand truck that is said to be light but practically indestructible. It is built by airplane-fabricating methods and is cast as a solid piece of aluminum. The wheels are also cast of aluminum and are equipped with rubber tires and tapered Timken roller bearings which require no lubrication. It is built in three sizes.

Two-Stage Regulator

MANNING, MAXWELL & MOORE, INC., Dept. I, Bridgeport 2, Conn., announce a combination of a two-stage regulator, pressure switch, and dual edgewise pressure gage, built into one unit for application with the coin-operated beverage vending machine.



Beverage dispensing machine gas regulator.

The function of this unit is to supply CO_2 to the beverage dispensing machine at low-regulated pressure.

It also provides simultaneous indication of pressure drops of cylinder gas. When this drops below predetermined set value, the regulator actuates the cut-out pressure switch, cutting off the current from the vending machine until the carbon dioxide cylinder is replaced.

Carton With Metal Ends

PAPER frozen food containers with metal ends are announced by Continental Can Co., Inc., Dept. I, 100 E. 42nd St., New York 17. These can be used on high-speed filling and closing machines.

Storage tests are said to show that vegetables packed in this new container register negligible moisture loss over a period of a year. The container is made of a treated paper body with metal ends. It is flat and rectangular in shape. Labels can be lithographed directly on the fiber body.

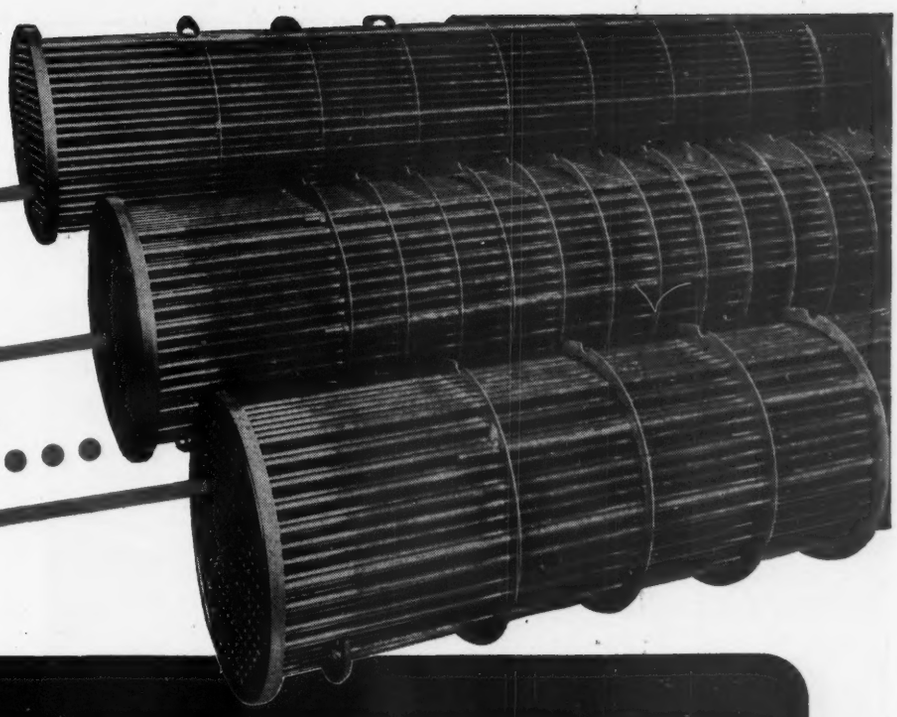
Paper-metal frozen food container.

Industrial Wheels

INDUSTRIAL WHEELS of light metal—cast solidly of aluminum and equipped with hard-rubber tires molded in place by a new process—have been put on the market by Northrop Gaines, Inc., a division of Northrop Aircraft, Inc., Dept. I, 1985 E. 16th St., Los Angeles, Calif. Wheel diameters now available are 6, 8, 10 and 12 in.

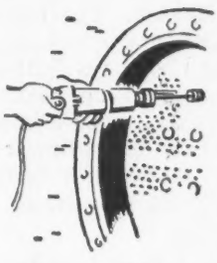
The wheels are designed for use on hand trucks, dollies and all rollable industrial equipment. Although they weigh as little as 3 lb., they are built

Right From the Start...



ELECTRUNITE HEAT EXCHANGER TUBES

Go in Faster... Stay in Longer



It's a start in the right direction when you specify Republic ELECTRUNITE Tubes in new heat exchangers and condensers, and for re-tubing of existing equipment.

ELECTRUNITE Tubes *go in faster,* because they are ALWAYS uniform in diameter, wall thickness and concentricity—made by the only process which insures these qualities throughout every length—*electric resistance welding.* And because tubes are full-normalized, they are free from hard spots . . . roll-in and bead over to tight, non-leaking joints without difficulty.

ELECTRUNITE Tubes *stay in longer,* because they are made from highest quality flat-rolled steel . . . because they are free from scale and failure-inviting scale pits . . . and because each length is thoroughly inspected and rigidly tested before it leaves the mill.

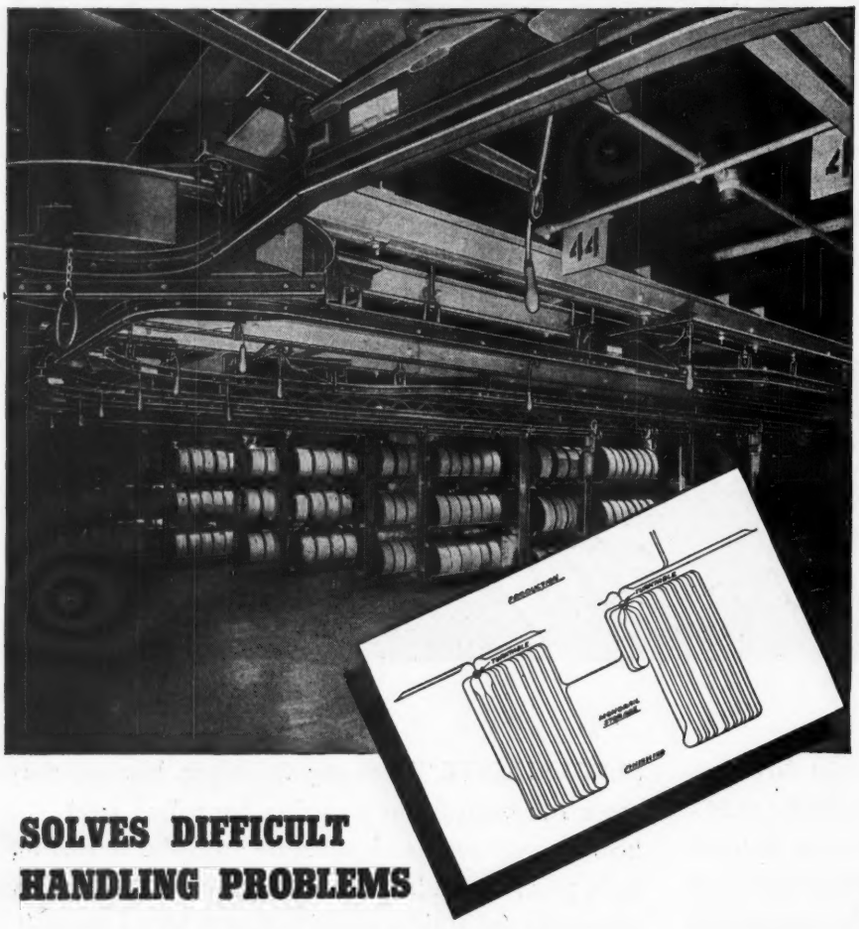
For complete information about ELECTRUNITE Tubes, including a list of sizes and various carbon and stainless steel analyses in which they are available, write to:

REPUBLIC STEEL CORPORATION
STEEL AND TUBES DIVISION • CLEVELAND 8, OHIO
Export Department: Chrysler Building, New York 17, New York

Republic
ELECTRUNITE
Reg. U.S. Pat. Off.
BOILER, CONDENSER AND HEAT EXCHANGER TUBES

FLEXIBILITY

OF AMERICAN MONORAIL EQUIPMENT



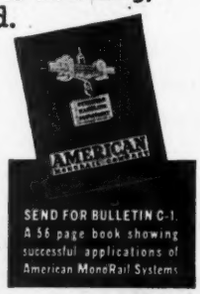
SOLVES DIFFICULT HANDLING PROBLEMS

Here is another of the hundreds upon hundreds of handling problems efficiently and economically solved by American MonoRail Overhead Handling Equipment.

THE PROBLEM: To eliminate manual handling of reels from production machines to storage, from storage to finishing, from finishing to storage or shipping as required.

THE ANSWER: The FLEXIBILITY of American MonoRail switching arrangements permits reels to move on carriers with no rehandling between processes. Ample live storage is allowed, permitting free movement between all processes.

What is your handling problem? American MonoRail Engineers come up with the answer to efficient and economical handling ninety-nine times out of a hundred. We invite your inquiries.



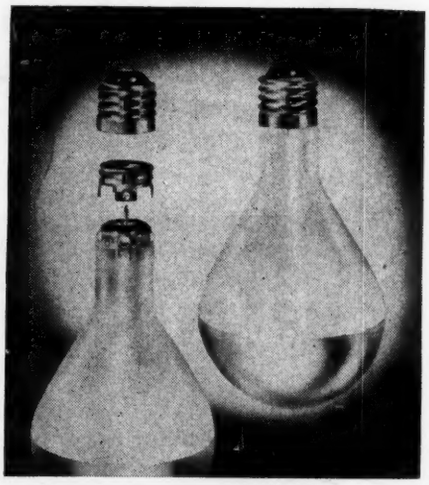
THE AMERICAN MONORAIL COMPANY

13125 ATHENS AVE. ● CLEVELAND 7, OHIO

to carry 40 percent more weight than any wheel of equivalent size. They are equipped with Timken tapered bearings, which require no lubrication during the life of the wheel.

Permanently Locked Lamps

LAMP BULBS permanently locked to the base are now standard on all Wabash-Birdseye lamps produced by Wabash Appliance Corp., Dept. I, 345 Carroll St., Brooklyn 31, N. Y. The new construction consists of a threaded collar screwed into and notch-

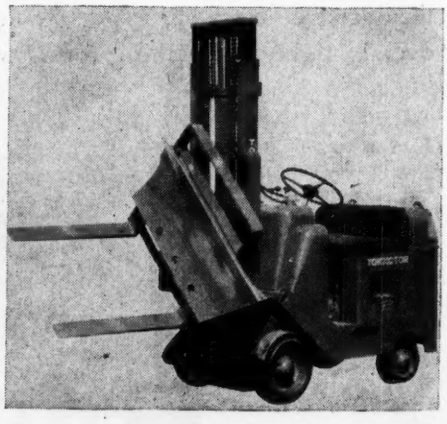


Lamp bulbs permanently locked to base.

locked to the base, with collar claws gripping the dimpled neck of the glass bulb. Base cementing and neck strapping is eliminated. The result is said to be a permanent lock that cannot be separated by the weight of the bulb, position of burning, heat or age. This is standard construction on all lamps from 300 watts upward. It also is used in all reflector lamps and industrial infrared heat lamps.

Handles Cylindrical Loads

DESIGNED to handle cylindrical loads safely, a new lift truck accessory is announced by Towmotor Corp., Dept. I, Cleveland, Ohio. This "Upender" is



Accessory for handling cylindrical loads.

IS THERE A NEW "BABY" IN YOUR COMPANY?

Have you a new product? Is it in powdered, granular, pebble, crystal or lump form? Does it require protection against moisture loss or absorption . . . loss of aroma or absorption of odors . . . dirt, sifting or contamination?

If you have a product like this, the Bemis Waterproof Bag is probably the ideal container. For years Bemis Waterproof Bags have provided manufacturers of many diversified products with these cost-saving advantages:

- *Bemis Waterproof Bags cost less than other containers that give the same protection.*
- *Filled or empty, they save valuable storage space.*
- *The light weight of Bemis Waterproof Bags means economies in shipping costs.*

Investigate the possibilities of Bemis Waterproof Bags as containers for your company's new "baby." Mail coupon below for interesting booklet, "A Guide to More Efficient Shipping."

If you desire, one of our representatives will call to discuss your packaging problems. Naturally, there is no obligation.

Get the Benefits of Scientific Bag Selection

Bemis Shipping Research Laboratory will determine the proper bag type for you — make tests to insure that materials specified will stand up under the packing, shipping and handling conditions your product will encounter—and maintain a constant check on these materials to make sure these rigid specifications are met.

WATERPROOF DEPARTMENT

BEMIS BRO. BAG CO.

St. Louis · Brooklyn

BEMIS BRO. BAG CO.,
408-C Pine St., St. Louis 2, Mo.;
5122 Second Ave., Brooklyn 32, N. Y.

Please send your special booklet, "A Guide to More Efficient Shipping" and details about use of Bemis Waterproof Bags for_____
(PRODUCT)

*Name*_____

*Company*_____

*Street*_____

*City*_____ *State*_____

Tough SANITIZATION PROBLEM?

Call in ROCCAL BRAND Sanitizing Agent

Here, at last, is the answer to your sanitization problem . . . ROCCAL, the germicide of tomorrow, ready to go to work for you today.

ROCCAL is based on a new principle of bactericidal action. It kills bacteria *in one minute!* It inhibits the growth of molds, slimes and algae.

And ROCCAL is *safe* . . . in recommended dilutions it is non-poisonous, virtually odorless and tasteless. It is non-corrosive . . . will not injure metal or fabrics. It is non-irritating to operator's hands. ROCCAL contains no phenol, active chlorine or heavy metals.

ROCCAL is accepted by many public health authorities throughout the country.

ROCCAL is economical . . . a little goes a long way.

Sample and literature on request

COLD STORAGE AND LOCKER PLANTS
Reduces spoilage losses by keeping refrigerators and lockers sanitary Does not affect odor or taste of food.

FISHERIES AND FISH PACKERS
For sanitizing storage areas of fishing boats and canneries, filet machines, shrimp de-veiners, etc.

FOOD PROCESSING PLANTS
Keeps equipment and storage areas sanitary. Inhibits growth of molds and slime-formers.

Industrial Division

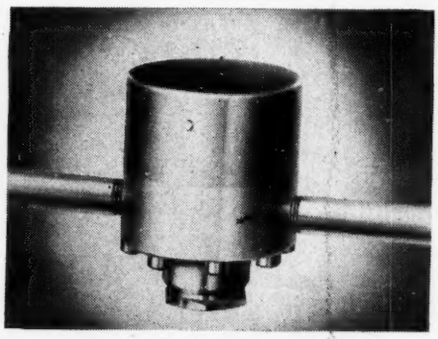
WINTHROP CHEMICAL COMPANY INC.

Dept. W-36, 170 Varick Street, New York 13, N. Y.

constructed of steel bars and angles. It has two carriages, one a regular elevating carriage mounted on the truck mast, and the other a revolving or upending carriage. A tapered blade of steel combined with a curved plate bolted to the unit carriage is the standard attachment for picking up cylindrical loads.

Pressure Reducer

SMALL and compact regulators weighing less than 2 lb. and measuring roughly 2¾x3¼ in.—suitable for handling initial pressures up to 3,500 lb., with an adjustable control range of 5 to 1,500 lb.—are manufactured by Grove Regulator Co., Dept. I, 6417 65th St., Oakland 8, Calif. Although primarily designed



Compact pressure-reducing regulator.

for air and gases, this diminutive unit also can be furnished for liquid service. It is made of Duraluminum and has stainless steel ports. Valve and seat construction was especially engineered for positive dead-end shut-off. It is said to be instantaneous in its operation. It is available for ⅛- and ¼-in. pipe sizes.

Cation Determination

THE USE of cation-active detergent germicides in food plants, milk and other industries, coupled with the requirements of health control agencies, has led to the development by

Test kit determines cation activity.

3 Points about DDT for insect control

1. CORRECT FORMULATIONS are necessary. For satisfactory results, DDT must be formulated in a composition having the proper strength and right carrier for the specific conditions under which it is to be used. Du Pont DEENOL DDT insecticides are prepared in five different types especially developed for the varying needs of commercial and industrial institutions.

2. PROPER USE of the correct formulation is next—and depends on you. When properly applied, Du Pont DEENOL DDT insecticides give you effective, *long-lasting* control of many common insect pests. That's why it's important to select the type of DEENOL DDT that's made for the job—and then apply it correctly.

3. RELIABLE INFORMATION for selecting and using the proper DDT formulation for your job is now available. The following chart, based upon Du Pont's research and experience, highlights the five present formulations of DEENOL DDT for commercial and industrial use. See your regular supplier. If he cannot supply you, write us for further information and our detailed DEENOL DDT folder. E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Dept., Wilmington 98, Delaware.

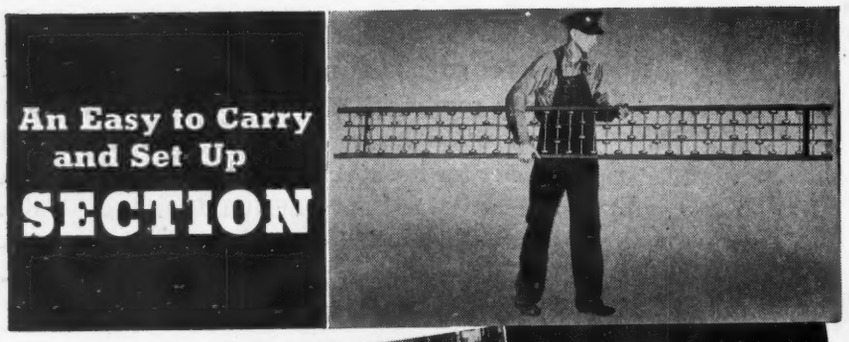
DEENOL 50-F	DEENOL 25-EM	DEENOL 5-H	DEENOL 25-C	DEENOL 10-A
Wettable powder; mix with water, use as spray. DDT—50%	Emulsifiable oil; dilute with water, use as spray. DDT—25%.	Ready-to-use oil spray. DDT—5%.	Concentrated oil; dilute with a solvent, use as spray. DDT—25%.	Ready-to-use dusting powder. DDT—10%.
For use on surfaces where *wetting* by water and *visible residue* are not objectionable.	For use on surfaces where *wetting* by water is not objectionable and *visible residue is* not desired.	For use on surfaces where *wetting* by water *is* objectionable and *visible residue is* not desired.	Designed for large users who may wish to prepare their own spray mixtures by adding solvents.	Use on floors and baseboards, in cracks and crevices of woodwork, dark places behind pipes and other places insects infest.
Effective against: Flies, ants, gnats, mosquitoes, fleas, ticks, wasps, cockroaches, carpet beetles, moths, silverfish, bedbugs, weevils, cadelle, and other stored product insects.				Designed especially for crawling insects such as cockroaches, ants, bedbugs, ticks, silverfish, lice.

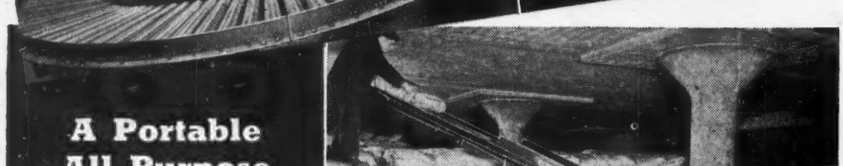
DU PONT
REG. U. S. PAT. OFF.

DEENOL
TRADE MARK

DDT INSECTICIDES FOR INDUSTRIAL USES

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY





Whatever Your Need in Conveying Equipment, Standard *offers* any one or all three

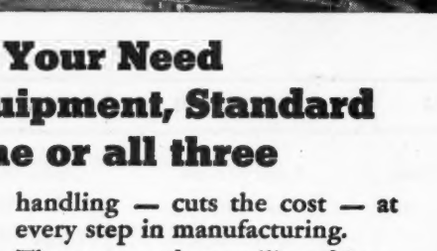
WHATEVER you have to handle — packages, parts, units,—from receiving of raw material through manufacturing or processing to storage or shipping, Standard equipment can speed operations — save time and cost.

An 8 to 10 ft. section of Standard Wheel Conveyor expedites "spot" handling — a Standard Handibelt or Handipiler portable unit stacks and piles packages easily and quickly to ceiling height or loads and unloads cars and trucks with ease and dispatch — a Standard system of power or gravity conveyors accelerates handling — cuts the cost — at every step in manufacturing.

The range and versatility of Standard Conveyors have been developed in more than 40 years of service to business and industry.

Write for valuable reference book "Conveyors by Standard" Catalog No. FI-36

STANDARD CONVEYOR CO.
General Offices: North St. Paul 9, Minn.
Sales and Service in Principal Cities

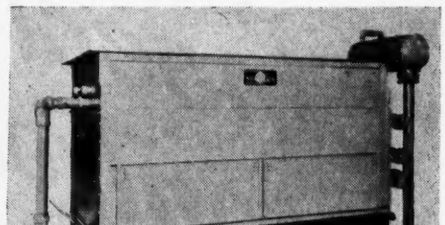


ROLLER · BELT · SLAT · PUSHBAR CONVEYORS • PORTABLE CONVEYORS AND PILERS • SPIRAL CHUTES • PNEUMATIC TUBE SYSTEMS

Emulsol Corp., Dept. I, 59 E. Madison St., Chicago 2, Ill., of a convenient and rapid analytical method for determination of cation activity in dilute solutions. The company also has devised a small, compact reagent kit for applying the new methods. With very little experience, an unskilled operator in the field is said to be able to complete a determination in less than two minutes with sufficient accuracy for the purpose intended.

Liquid Cooler

COOLING water or any aqueous solution for industrial uses is accomplished by a liquid cooler manufactured by Niagara Blower Co., Dept. I, 6 E. 45th St., New York 17. It is intended for cooling the water supplied to air conditioning units or to the cooling jackets of industrial processing equipment.



Industrial liquid cooler.

The cooling of the liquid is accomplished by spraying it over banks of coils in which a refrigerant is expanded. According to the manufacturer, it is possible to produce 33-deg. F. water constantly, without danger or damage from freezing. The range of capacities runs from 4.7 to 137 tons of refrigeration.

All parts of the cooler are accessible for cleaning.

Timer

PHOTOSWITCH, INC., Dept. I, 71 Broadway, Cambridge 42, Mass., is manufacturing an industrial electronic repeat cycle-timer, designed for process control. It is recomended for applications requiring two adjustable time-periods to run in a continuous cycle. This cycle is initiated by either momentary or sustained contacts, and provision for automatic recycling is provided. Each timing period is adjustable from 1/20th second to two minutes.

Specially designed snap-action relays result in extreme accuracy and interchangeability. Internal variations in repeat cycle-timing are less than 2 percent.

CATALOGS, BULLETINS

This selected information on new publications is offered by FOOD INDUSTRIES Readers' Service through cooperation with the manufacturers. It helps executives save valuable time. To obtain literature described, simply fill in form below, clip it to your letterhead and mail to FOOD INDUSTRIES. There is no cost, no obligation.

Food Plant Equipment

Diesel Power 1

"Power As You Like It" is a new 8-page color booklet published by Caterpillar Tractor Co., Peoria. It is replete with photographs showing examples of how "Caterpillar" Diesel power is being used.

Bagging Scales 2

Bulletin No. 30F, published by OK Scale Co., Buffalo, describes and illustrates bagging scales weighing units up to 200 lb., at a rate of from four to six per minute.

Safety Valves 3

A complete line of safety and relief valves is described in Catalog No. 45, issued by Farris Engineering Company, Palisades Park. Many new valve designs and improvements in old designs are included.

Condensers and Coolers..... 4

The Griscom-Russell Co., New York, has prepared a bulletin that describes condensers and coolers. The first portion of the bulletin describes an exchanger for condensing and cooling fluids without the use of water. Typical applications in which the unit is adaptable are listed.

Boilers 5

Specifications, drawings and photographs of various types of boilers are given in a 20-page booklet released by Union Iron Works, Erie.

Wrapping Machine..... 6

Package Machinery Co., Springfield, has released a 4-page folder that describes their "Universal Model 4" wrapping machine. This machine is said to offer high speed and easy adjustability in wrapping various sized packages.

Shipping Room Equipment..... 7

Catalog No. 876, describing labeling machines, casers, boxers, unscramblers and sealers, has been released by the Chisholm-Ryder Co., Inc., Niagara Falls.

Drain Cleaning Machine..... 8

Kollmann Mfg. Co., Erie, has recently issued a bulletin covering three models of sewer and drain cleaning machines. All of these machines are well illustrated.

Refrigerating Equipment 9

Frick Co., Waynesboro, has released a 34-page catalog describing and illustrating refrigerating, ice making, and air conditioning equipment. Numerous types of compressors and condensers are included. In addition, there are a number of useful refrigeration tables.

Plant Supplies

Roller Chain Belt.....10

An 8-page folder on roller chain belts is being distributed by the Baldwin-Duckworth Division of the Chain Belt Co., Springfield. A detailed description of the roller chain features is presented. This, together with a table of specifications of the more popular sizes, with their list prices, makes the folder a handy reference piece.

Fiberglas Insulation.....11

Owens Corning Fiberglas Corp., Toledo, has released a 28-page booklet containing design and application data

MARCH, 1946

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FOOD INDUSTRIES, 330 W. 42nd St., New York City 18

Please have manufacturer send me, without obligation, literature circled below.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

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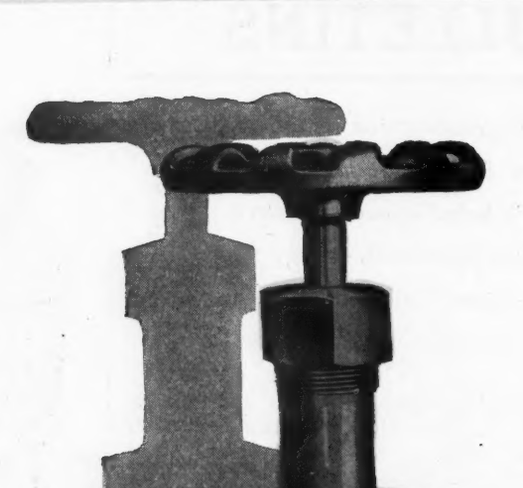
ADDRESS .....

DAMP-TEX
ENAMEL
FOR WET
EQUIPMENT
and WALLS
FRIEND
OF THE PLANT
OWNER... WHO HAS
A WET SURFACE
MAINTENANCE PROBLEM
The Damp-Tex system of painting kills rust, rot, fungus and bacteria. Stops deterioration. Can be applied on any paintable surface, wet or dry, with equal ease and efficiency ... changing dingy, rough light-blotter interiors into glistening porcelain-like beauty. One coat covers. Resists acid, alkali, corrosive gases and oxidation. Dries overnight without flavor-tainting odor into waterproof film. Comes in white and colors.
Write for our trial offer.
LIQUID PORCELAIN-LIKE
DAMP-TEX FOR
WET
OR DRY SURFACES
STEELCOTE MFG. CO.
ST. LOUIS 3, MO.
Canadian Manufacturer:
Standard Paint & Varnish Co.,
Windsor, Canada



...the WALWORTH
No. 225P

The Toughest Bronze Valve your money can buy

THE stainless steel, non-corrosive seats and discs of the Walworth Number 225P are heat treated to a hardness of 500 Brinell – hard enough to scratch glass and crush nails.

Because of this extreme hardness the valve is tough enough to be closed on sand, slag, scale, and similar flotage without injury to the seating surfaces, and "wire drawing" is practically eliminated. Even after years of severe service Number 225P will assure tight, positive shut-off.

Union bonnet type construction, plug-type seats and discs, deep stuffing boxes, oversize stems and sturdy bronze bodies assure maximum protection against wear and leakage. Valves may be repacked under pressure, when fully opened. Available in both globe and angle types (angle Type No. 227P) in sizes ¼" to 2", this quality valve is recommended for 350 lbs. superheated steam pressure, maximum temperature 550F, and 1000 lbs. non-shock service on cold water, oil, gas or air.

For further information on this long-life, economical Walworth Bronze Valve see your nearby Walworth distributor, or write for Catalog No. 42.

Walworth VALVES AND FITTINGS

60 EAST 42nd STREET, NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

on Fiberglas thermal insulation materials as used by equipment manufacturers. Included in the list are insulations for refrigerators, water heaters, boilers, bakery ovens, roasters and a number of others.

Sanitation 12

Oakite Products, Inc., New York, has released a 26-page booklet entitled "Digest of 77 Sanitation and Maintenance Cleaning Tasks." In it are included methods and related sanitation technics that have helped to successfully save time and prevent product spoilage loss as well as increase efficiency of plant maintenance. These are tasks generally performed in meat packing and sausage plants.

Plastic Coatings 13

James Lithgow Co., Los Angeles, has just issued a bulletin profusely illustrated with photographs of equipment that has been coated with their plastic coating material. The plastic coating is said to be contamination proof, tasteless, odorless and is able to withstand shipping, pressure and sterilization. It is said to pass all Food and Drug regulations.

Insulating Cement 14

Baldwin-Hill Co., Trenton, has released a 4-page illustrated folder covering insulating cements. It provides factual information, tables and charts on the efficiency, coverage and ease of application of the product.

Materials Handling Equipment

Lift Truck 15

A lift truck that will tilt backward from center 15 deg. or forward 5 deg. is described in a new bulletin issued by Crescent Truck Co., Lebanon. Its design, power and strength and economy are described in this bulletin.

Trucks 16

Harmon-Herrington Co., Inc., Indianapolis, has released a 20-page multicolored catalog on several types of trucks. Included are door-to-door delivery trucks with removable front-wheel drive, and heavy duty all-wheel drive trucks.

Materials Handling 17

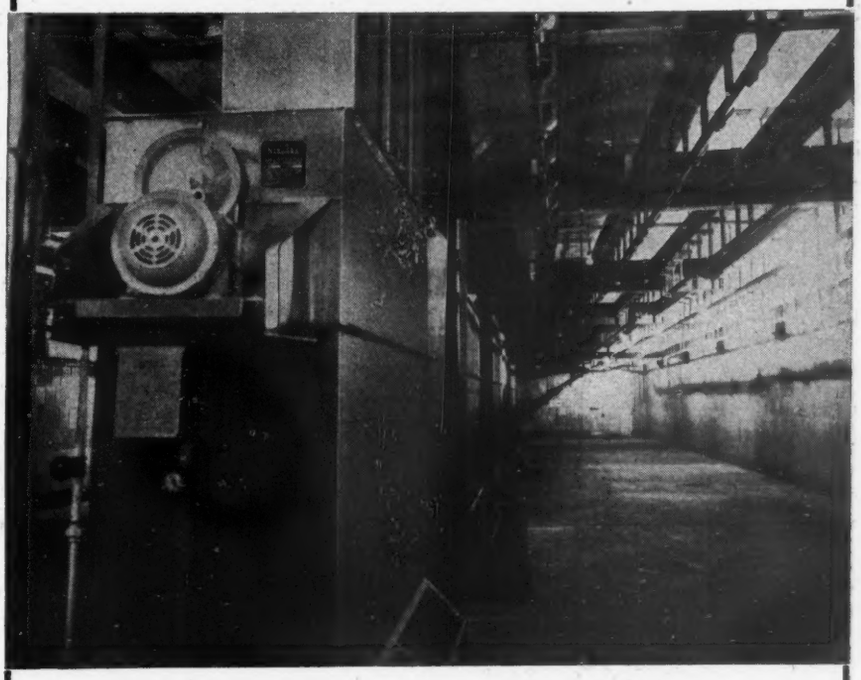
A 78-page booklet describing various materials handling equipment has been published by Lewis-Shepard Products, Inc., Watertown. Numerous illustrations are shown, depicting the various functions performed by the equipment included in the catalog, such as portable cranes, lift trucks, platform and other types of trucks.

Multi-Tier Conveyor 18

J. W. Greer Co., Cambridge, has issued a bulletin describing the principles of construction and operation of the multi-tier conveyor. It is illustrated with drawings and photographs.

NIAGARA *No-Frost Method*

Increases Production and Improves Quality



A New England firm producing fresh frozen berries installed the Niagara "No-Frost" Method for a capacity of 1,500 pounds of berries per hour. In actual operation, 2,000 pounds per hour were frozen. The operator states that they were the finest frozen berries he had ever produced. There was no spoilage.

Many plants all over the nation have found the Niagara "No-Frost" Method will increase production, get uniform production and produce higher quality products—all helping to increase profits.

Write for Niagara "No-Frost" Bulletin No. 83 for further information.

NIAGARA BLOWER COMPANY

Over 30 Years of Service in Industrial Air Engineering

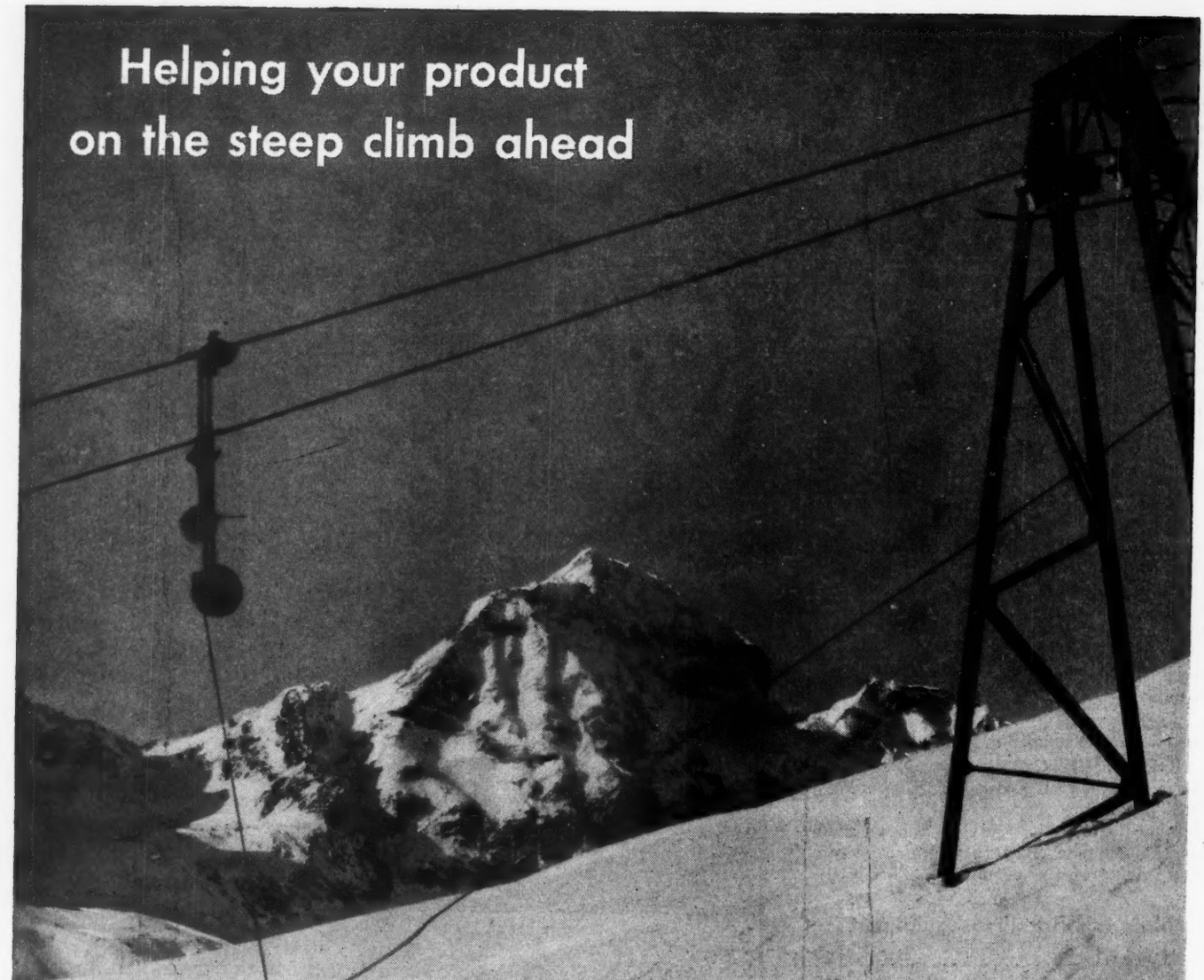
DEPT. FI-36, 6 E. 45th St. NEW YORK 17, N. Y.

Field Engineering Offices in Principal Cities

INDUSTRIAL COOLING HEATING • DRYING

NIAGARA

HUMIDIFYING • AIR ENGINEERING EQUIPMENT



The period of heavy competition among all foodstuffs draws near.

Mrs. Housewife of today knows that vitamins are essential food elements for proper nutrition. You can count upon her to check your labels for vitamin declarations. She will buy enriched food values wherever possible.

Be ready to meet this challenge. Study the possibility of improving your product through enrichment with 'ROCHE' vitamins. Let enrichment *help your product on the steep climb ahead.*

"ROCHE" VITAMIN DIVISION

HOFFMANN-LA ROCHE, INC., Nutley 10, N. J.

FOOD TECHNOLOGY

NEW DISCOVERIES AND INVENTIONS

VITAMINS

Vitamin Spread

FULLY hydrogenated vegetable oil and a sugar, in the proportion of 1 part to 2, are mixed to a smooth paste and used as a carrier for vitamins or vitamin concentrates. It is claimed, in an issued patent, that this mixture will carry the complete daily requirement of all the necessary vitamins in a portion that can conveniently be spread on crackers or cookies.

Nonoxidative properties are imparted by using a sugar component prepared by heating a disaccharide to a temperature of 250 to 400 deg. F. for 1 to 5 minutes. Hops, powdered or as an extract, contribute a desirable flavor effect, and at the same time greatly improve oxidation resistance. The hops are claimed to be more effective, for instance, than commonly used cereal derivatives.

It is claimed that in the presence of as little as 1 percent of the hop extract the spread can be kept at ordinary temperatures, with no particular protection from the air.

Digest from U. S. Patent 2,382,242, issued August 14, 1945, on an application dated July 8, 1943, to C. W. Lindow and J. J. Thompson, and assigned to Kellogg Co., Battle Creek, Mich.

Ascorbic Acid Loss

BLANCHING of vegetables, preparatory to freezing, results in a reduction of ascorbibc acid. To test the effect of steam and hot water as blanching agents, experiments were carried out on stringless black Valentine snap beans and cauliflower. A decrease in ascorbic acid content of beans from 180 mg. per g. in the raw beans to 170 in those blanched with steam and 160 in those blanched with hot water, and in cauliflower from 900 mg. per g. raw value to 830 and 700 mg. per gm. respectively, was observed.

Cooling and freezing had little effect on ascorbic acid content of beans, but cauliflower continued to decrease. Both vegetables lost ascorbic acid steadily during freezing storage. After four months snap beans retained between 65 and 70 percent of their original raw value and about 80 percent of their initial frozen ascorbic acid content. Cauliflower, after four months' storage, retained only 50 to 55 percent of its raw value and 70 to 75 percent of the ascorbic acid it had when first frozen. Steam-blanched cauliflower showed a slightly smaller loss on freezing.

Digest from "Effect of Steam and Hot-Water Blanching on Ascorbic Acid Content of Snap Beans and Cauliflower," by J. L. Retzer, F. O. Van Duyne, J. T. Chase and J. I. Simpson, *Food Research*, vol. 10, 518-24, November-December, 1945.

Fortifying Rice

FORTIFYING milled-rice grains, while preventing the development of opacity, checking, cracking or breaking of the grains is the subject of a recent patent. This is accomplished by subjecting the grains to the action of a water solution of a fortifying agent and a salt in an amount equal to at least 90 percent of saturation, drying the grains and coating them with a water insoluble film.

According to the patentee, the film protects and retains the enriching material during washing or rinsing of the grains, and during packaging and handling. In cooking, the hot water diffuses through the membrane, the grains swell and rupture the protecting film, permitting cooking similar to ordinary milled rice. Appearance of the grains is similar to that of untreated rice.

Digest from U. S. Patent 2,390,210, issued Dec. 4, 1945, on an application dated Mar. 8, 1944, to E. A. Fieger and V. R. Williams, and assigned to Board of Supervisors of Louisiana State University and Agricultural and Mechanical College, Baton Rouge, La.

MEATS

Bacon Spoilage

APPLICATION of chemicals to cured Canadian bacon does not prevent spoilage during shipping. Smoking and desiccation with reduction in moisture content, is most effective. In an extensive investigation 77 chemical treatments were applied to freshly cured Wiltshire backs which were stored at 45, 60 and 75 deg. F. for periods of 15 and 30 days. They were scored from organoleptic tests based on odor and color, and presence of slime and mold.

Among the chemicals used were benzoic acid and benzoates, boric acid and borax, formaldehyde, citric and hydrochloric acids, sodium, hydroxide, acetylsalicylic acid, propylene glycol, urotropin, pyruvic acid, salol and aerosol-SS. Several treatments were partially effective at 45 deg. F. but were of very little value at higher temperatures. None can be considered satisfactory.

Films of polyvinyl alcohols, and commercial waxes were ineffective. Dimethylol urea in a vaseline paste when applied to smoked bacon gave some protection. Storage in an atmosphere of CO_2 was not effective. Best preservation was given by smoking and a desiccation treatment. The sides were in good condition after 60 days, except for heavy mold growth on the surface of those with over 35 percent moisture.

Digest from "Canadian Wiltshire Bacon. XXV. Chemical Preservation for Maintaining Quality at High Storage Temperatures," by W. Harold White, N. E. Gibbons and M. W. Thistle, and, "Canadian Wiltshire Bacon. XXVI. Further Observations on the Preservation of Quality at High Storage Temperatures," by W. Harold White, M. W. Thistle and T. A. Steeres, *Canadian Journal of Research*, vol. 23F, 340-350 and 351-362, November, 1945.

DAIRY

Absorption of CO_2

FAT CONTENT of powdered milk is a factor in its ability to absorb gases. Source of the powder and daily variations in plant operations are also important. To study the factors affecting absorption of CO_2 and nitrogen, spray-dried whole milk powders, containing 26, 28 and 30 percent fat, and skim powders, containing 1 percent fat, were subjected to atmospheres of the two gases, in varying concentrations at approximately normal atmospheric pressure.

The absorption of CO_2 was 0.444 cc. per g. of powder after 150 hours, and of nitrogen, 0.012 cc. in 70 hours. By diluting CO_2 with 80 percent nitrogen the rate of absorption was reduced effectively. Temperature had little effect on the weight of gases absorbed. Moisture contents between 1.8 and 5.0 percent had little effect.

Curves plotted for whole milk powders, had the same slopes and constants, those of skim powders were different, indicating that gases are absorbed by both fats and other constituents. Large differences in the curves were apparent between powders from different plants, and dif-

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ferent batches from the same plant. Curves from the same powder were reproduceable.

Digest from "Dried Milk Powder II. Factors Affecting the Sorption of Carbon Dioxide," by Jesse A. Pearce, *Canadian Journal of Research,* vol. 23F, 327-33, November, 1945.

Whey Proteins

SOLUBLE whey proteins that are undenatured and free of ions that affect the baking properties have been prepared for studies in connection with the production of non-fat dry milk solids for the baking industry.

Estimation of the heat labile proteins by saturation of milk with sodium chloride and acidification of the filtrate with hydrochloric acid to pH 2.0, yields lower whey protein and higher casein values than the generally accepted method of Rowland.

Treatment at 176 deg. F. for 45 min. denatures about 93 percent of the whey proteins, as determined by the sodium chloride-hydrochloric acid method. At 203 deg. F. maximum denaturation, 95 percent, is reached after 10 minutes.

Digest from "The Preparation and Effect of Heat Treatment on the Whey Proteins of Milk," by H. A. Harland and U. S. Ashworth, *Journal of Dairy Science,* vol. 28, 879-86, December, 1945.

BAKING

Dried Eggs in Cakes

SPRAY-DRIED whole eggs can be used in the preparation of plain butter cakes or baked custards that compare favorably with those made from fresh eggs, provided the egg powders are of good quality, and have been stored under favorable conditions. Trials were made with five spray-dried whole egg powders, one of which was B grade, one had been stored at ordinary temperatures for twelve months, one a strictly fresh product, and two that had been stored for eight months under refrigeration.

Two methods of using the dried eggs in butter cakes were tried. In one method, the egg powder was reconstituted with water before use, in the other the dried egg powder was sifted with the flour and baking powder before incorporating it into the cake batter. There was no significant difference in the opinion of the judges, between the cakes made by either method.

Cakes made from the Grade B egg powder and the one stored for twelve months at room temperatures scored considerably lower than those made from the other powders and from

(*Turn to page* 184)

CASE HISTORY No. 3

in a series of factual experiences of a group of American manufacturers with Multiwall Paper Bags.

COST COMPARISON

	100 lb. Osnaburg	100 lb. Paper Bags
Container Cost	.150	.068
Container Cost per 100 lbs.	.150	.068
Labor Cost	.014	.006
Total Cost per 100 lbs.	.164	.074
Savings per 100 lbs. Paper over Fabric		.090
Saving per ton Paper over Fabric		1.80

DETAILS OF LABOR COST

	Production per hour	Cost Per 100 lbs.
100 lbs. Osnaburg		
8 men filling		
6 men weighing, closing, and handling	60,000 lbs.	.014
(average wage rate 60c per hour)		
100 lb. Paper (6 valve bag Packers)		
6 men filling		
6 men handling	120,000 lbs.	.006
(average wage rate 60c per hour)		

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Many are financially unable, some are unwilling, and some though willing and financially able have not the background necessary, to undertake a satisfactory day by day dietary program.

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fresh eggs. The solubility indexes of these two powders were 2.7 and 3.3, contrasted with 4.6, 4.6, and 4.7 for the others. It appears that powders of lower solubilities tend to yield cakes of lower volume and poorer eating quality.

Custards, baked with powders of lower solubility, were of poorer quality than when higher solubility powders were used. They had lower pH values, took longer to reach the baking temperature, and were less firm than those from higher quality powders or fresh eggs. Flavor of custards made from fresh eggs were judged superior to those made from dried eggs, and the low-quality dried eggs were judged more objectionable in custards than in cakes.

Digest from "Plain Butter Cakes and Baked Custards Made from Spray-Dried Whole Egg Powder," by J. E. Ary and R. Jordan, *Food Research*, vol. 10, 476-484, November-December, 1945.

CEREAL PRODUCTS

Separating Starch And Gluten

STARCH and gluten in flour are separated by a relatively simple method. Patent flour is mixed with 80 to 85 percent of its weight of water. The dough, at a temperature of 77 to 86 deg. F. is mixed for 15 to 25 minutes. Additional water is added and the agitation continued until the dough is broken into curds 1 cm. in diameter. The mixture is pumped into a 150-mesh gyrating screen to separate the gluten curds from the starch milk. By shredding the gluten into water and agitating, the starch content can be reduced until the gluten recovery is close to 100 percent. Approximately 90 percent of the starch is recovered.

Digest from "Separation of Starch and Gluten. III. A Rapid Method of Separation from Wheat Flour," by A. L. Shewfelt and G. A. Adams, *Canadian Journal of Research*, vol. 23F, 373-382, November, 1945.

Puffed Cereal Product

A PROCESS of producing an edible cereal product from a farinaceous dough, such as corn meal, by cooking, forming into pellets, flattening the pellets to form flakes and expanding the volume of the flakes by explosive puffing, has been patented recently.

The dough is mixed and kneaded while being cooked, then forced through an extruding die having a knife associated therewith to sever the extruded material and form pellets. The pellets are dried to from 14 to 30 percent moisture content, flattened to form flakes and further

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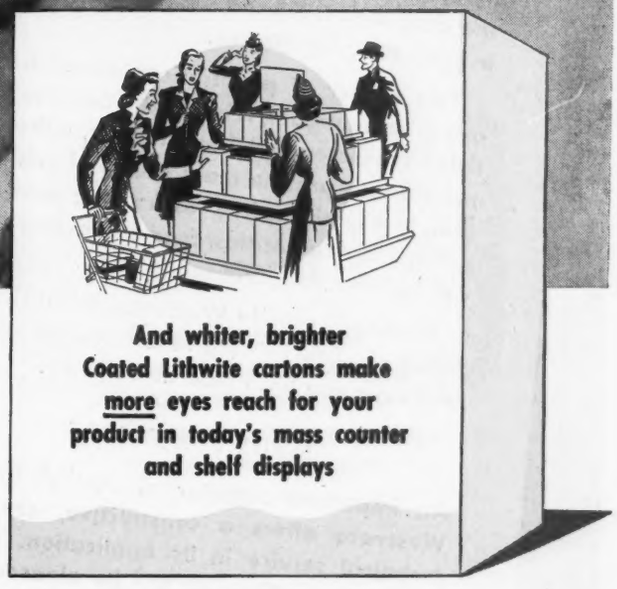

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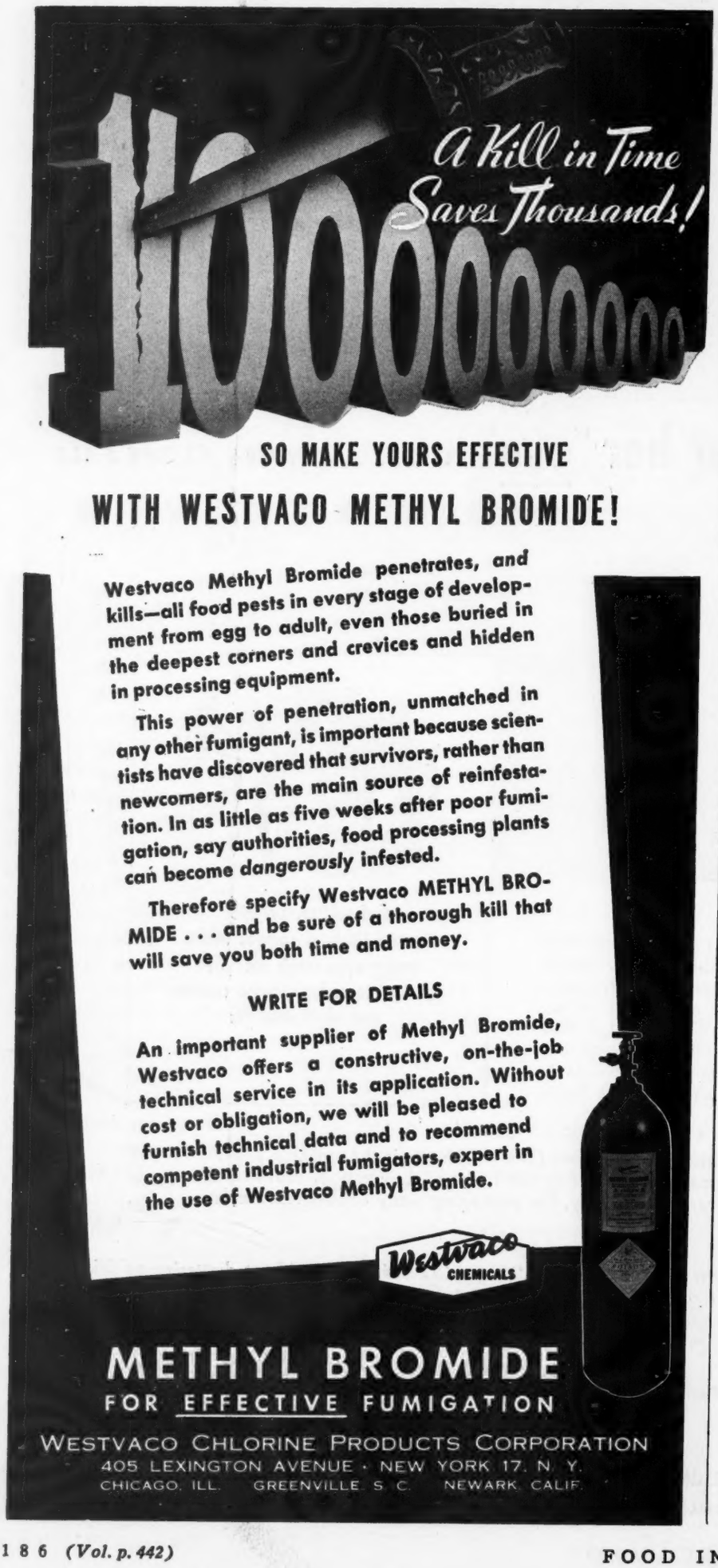
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dried to from 11 to 16 percent moisture. Flakes are tempered to permit equalization of moisture content throughout, and puffed in a revolving "puffing gun" at a temperature of 375 to 450 deg. F., and pressure of from 80 to 110 lb. per sq. in.

Digest from U. S. Patent 2,388,904, issued Nov. 13, 1945, on an application dated Jan. 30, 1943, to F. A. Collatz, and assigned to General Mills, Inc., a corporation of Delaware.

MATERIALS

Alloy Coating on Metals

RESISTANCE of metals to tarnish by hydrogen sulphide and to corrosion by food acids is produced by plating with speculum.

Speculum is an alloy containing 40 to 45 percent tin and 55 to 60 percent copper. It is applied by co-electro-deposition from a bath containing sodium stannate and sodium cupro-cyanide. The coating is silver-white, hard, easily polished to a high luster, resistant to corrosion by a variety of aqueous solutions. The process is available commercially for coating steel, tin plate, copper, brass and pewter. In normal indoor atmospheres the coating remains bright for years without polishing.

Digest from "Developments in Tin and Tin Alloy Coatings," by E. S. Hedges, *Chemistry and Industry*, pp. 370-73; December 1, 1945.

STORAGE

Temperature Changes

TEMPERATURES of dry granular products in bulk storage vary only slightly as a result of seasonal changes in temperature.

To evaluate temperature changes of grain stored in an elevator the thermal conductivity, and thermal diffusivity of wheat were determined by heating in a galvanized iron cylinder one foot in diameter. Temperatures were measured by thermocouples spaced at equal intervals along the side of the cylinder. When the data obtained is applied to the daily temperature changes it is found that five inches below the surface of wheat stored in a bulk bin, a variation of 20 deg. F. between day and night would produce a change of less than 1 deg. F. For a seasonal change of 77 deg. F. the change would not be noticeable at depths greater than 13 ft. below the surface. The results indicate that wheat stays for a year at about the temperature at which it was put into the bin.

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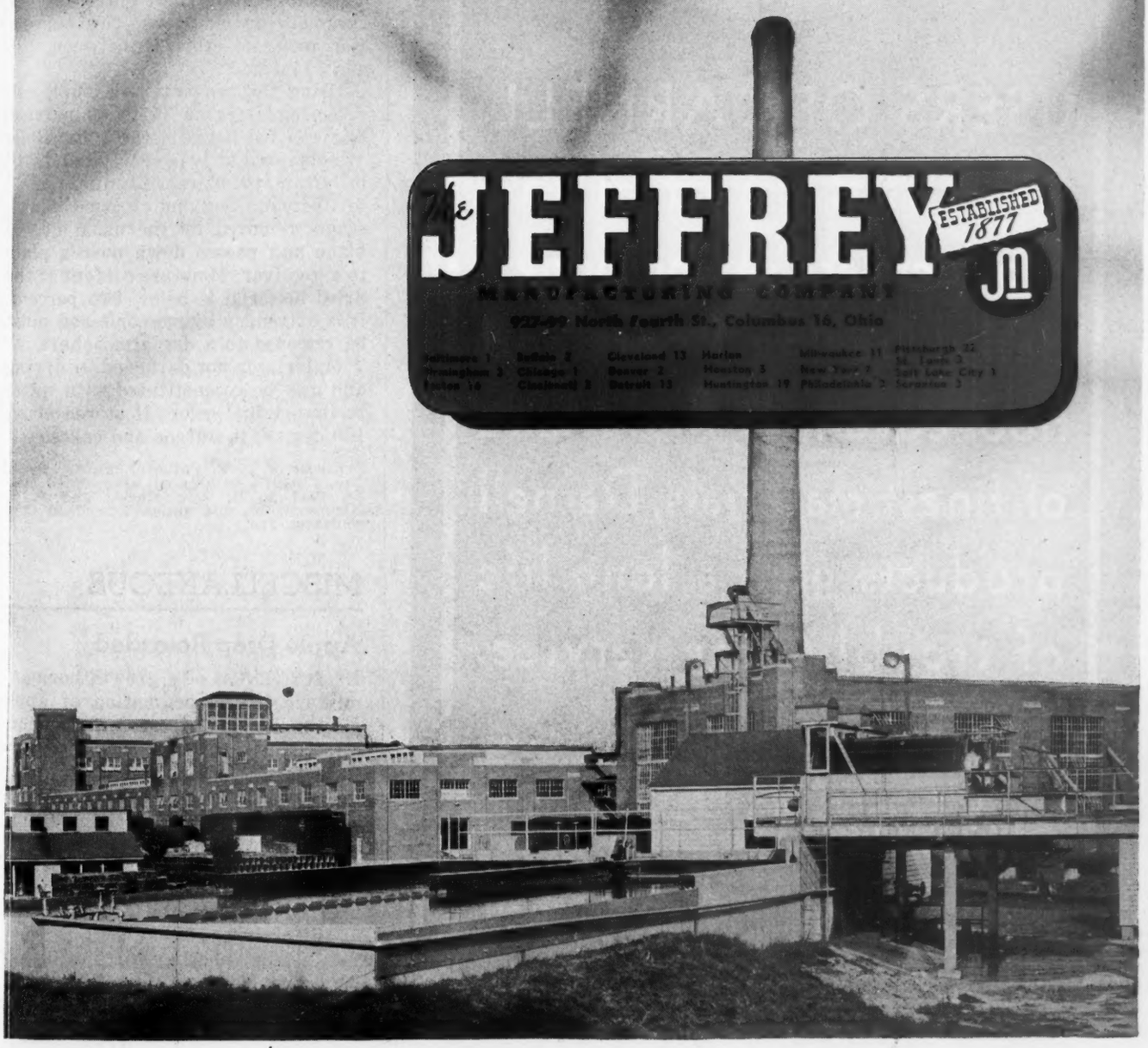

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While not applied to materials other than wheat, the principle involved would seem of general application to bulk storage of dry granular products. When the useful character of the product could be changed by long storage at temperatures slightly higher or lower than normal, the heat diffusivity of the material may be well kept in mind.

Digest from "The Thermal Properties of Wheat in Bulk," by J. D. Babbitt, *Canadian Journal of Research*, vol. 23F, 388-401, November, 1945.

DEHYDRATION

Molasses Dried

DRYING molasses, corn syrup, malt syrup and solutions containing chiefly invert sugars on an atmospheric roll drier is covered by a recent patent. The trick is to hold the temperature of the molasses on the drum above its boiling point but below the caramelizing point of the sugars. For molasses, this is between 306 and 335 deg. F.

Using the conventional double-roll drier, molasses at 75 to 80 percent solids is fed between the rolls. Rolls are operated at between 100 and 110 lb. steam pressure and rotate at 7 to 10 r.p.m. The film of dried molasses is removed by the usual doctor blade and passes down over a plate to a receiver. Moisture content of the dried material is below two percent, it is extremely hygroscopic and must be removed to a dry atmosphere.

Material is not darkened in drying and may be reconstituted with water to its original color. If stored above 100 deg. F. it softens and cakes.

Digest of U. S. Patent 2,391,033, issued Dec. 18, 1945, on an application dated Mar. 28, 1942, to R. T. Northcutt and R. T. Northcutt, Jr., and assigned to Food Concentrates, Inc.

MISCELLANEOUS

Apple Drop Retarded

EFFECTIVENESS of a growth hormone mixture in the prevention of apple drop following frost was demonstrated in England after the severe frost in the spring of 1945.

Two varieties of apple trees were selected for trial; Miller's Seedling and Cox's Orange Pippin, both loaded with fruit. Trees were sprayed with a mixture containing 5 p.p.m. beta indole butyric acid, 5 p.p.m. alpha naphthalene acetic acid, 5 p.p.m. 2-4 dichloro phenoxy-acetic acid and 60 p.p.m. beta-naphthoxyacetic acid.

Within 14 days practically all of the fruit had fallen from the un-

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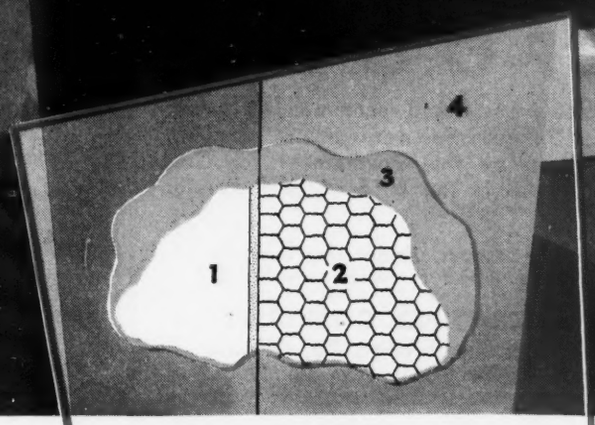

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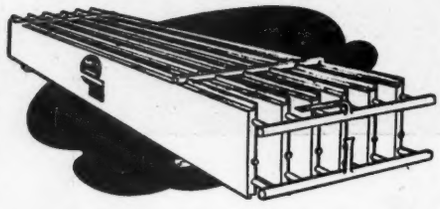

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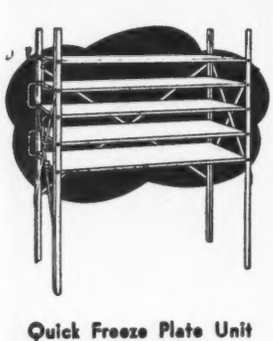

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sprayed trees of Miller's Seedling, whereas none had fallen from the sprayed trees. The fruitlets had begun to swell and there was considerable leaf epinasty. The spray had no effect on the Cox's Orange Pippins. By July 14, the fruit was so thick on the sprayed Miller's Seedling trees that some were thinned. There was practically no fruit on the unsprayed trees. The crop was picked on August 14. Effect of the treatment is shown by the yields per tree. Trees sprayed, but unthinned, produced an average of 169 lb., thinned 60 lb., and unsprayed 17 lb. Although thinning resulted in a larger percent of apples grading above 1½ in. in diameter the late date at which it was carried out greatly reduced the yield.

The complexity of the problem is indicated by the fact that materials that proved highly effective on Miller's Seedlings were without effect on Cox's Orange Pippins.

Digest from "Use of Growth-Promoting Substances in the Prevention of Apple Drop following Frost," by T. Swarbrick, *Nature*, vol. 156, 691-92, Dec. 8, 1945.

Specific Heat of Foods

HEAT CAPACITY values for foodstuffs are important factors in process engineering and in equipment design but are rarely reported. Any such data, no matter how incomplete, should be made available.

Specific heats of certain dehydrated vegetables and of eggs, determined by a method of mixtures with proper corrections to insure accuracy, are shown in the accompanying table.

No data are yet available for variations from season to season or for variety, growing conditions and other factors which may influence the heat capacity of these materials.

The specific heat rises with water content, the mean specific heat between 80 and 151 deg. F. (27 and 66 deg. C.) being 0.543 cal./gram/deg. C. at 14.5 percent water for carrots, 0.544 at 14.5 percent for eggs and 0.514 at 15.95 percent for cabbage.

Digest from "Specific Heats of Dehydrated Vegetables and Egg Powder," by F. Stitt and E. K. Kennedy, *Food Research*, vol. 10, 426-38, September-October, 1945.

Mean Specific Heats Between 80.6 and 150.8 Deg. F. (27 and 66 deg. C.)

Material	Water percent	Specific heat cal. gram deg. C.
Beats, diced	4.4	0.48
Cabbage, leaf	5.4	0.52
Carrots, diced	4.4	0.50
flakes	6.0	0.52
Eggs, spray dried	3.0	0.44
	4.2	0.45
Onions, flakes	3.3	0.47
Potatoes, diced	6.1	0.41
strips	8.0	0.46
Spinach, leaf	5.9	0.43
Sweet potatoes, diced	7.6	0.49

BOOKS

Wholesome Bugs

MICROBES OF MERIT. By Otto Rahn. Published by Jaques Cattell Press, Lancaster, Pa., 1945. 6¼x9⅜ in.; 277 pages; cloth. Price, $4.00.

Why it did not occur to someone to write such a book long ago is perhaps the most astonishing aspect of the appearance of this one. So much attention has been given to the relatively few bacteria, associated with disease, that the essential part played by most microbes has been all but ignored.

In this simply written and exceedingly interesting little volume, the useful microbes are at last given the attention they deserve. The book provides useful background material for those engaged in any branch of the food industry, particularly those unacquainted with the food sciences. Its presentation of the history of the microbe hunters, during the past 300 years, is so closely linked with the history of food preservation as to be almost the same thing.

The author, who is professor of bacteriology at Cornell University, is well known in the food field.

Food Chemists Review

ADVANCES IN PROTEIN CHEMISTRY, VOL. II, Edited by M. L. Anson and John T. Edsall. Published by Academic Press, Inc., 125 E. 23rd St., New York 10, N. Y., 1945. 6¼x9½ in.; 443 pages; cloth. Price, $6.50.

This volume should have both a practical and a high interest value for the food chemist. Its carefully selected papers offer an analytical review of the advances in protein chemistry since the publication of the first volume, with particular attention given to amino acids.

All the papers, without exception, are applicable to the food field, though naturally the interest is limited to the chemical aspects.

Flour Argument

WHITE VERSUS BROWN FLOUR. By F. L. Dunlap. Published by Wallace & Tiernan Co., Inc., Flour Dept., P.O. Box 178, Newark, N. J., 1945. 6¼x9¼ in.; 272 pages; cloth. Free to food technologists.

All the factors in the long controversy over white and brown flours are brought together here, and many popular misconceptions on the issue are discussed.

While the author attempts to maintain an impartial attitude, the advocates of brown flour will find little to support the claims they have been trying to advance.

The book loses no time getting to the point. The very first page sets out to show that our forebears ate the same type white bread that we are now enjoying. Moreover its nutritive value was no better. In subsequent chapters, practically every phase of flour milling and uses is given attention, from both the biological and the nutritive angle.

Altogether it is a book that anyone dealing with any aspect of flour or flour products will find well worth reading.

British Food

FOOD INDUSTRIES MANUAL. Edited by T. Crosbie-Walsh. Published by Leonard Hill Ltd., 17 Stratford Place, W. I. London, England, 1945. 5¾x8¾ in.; 1062 pages; cloth.

This is a British compendium on the manufacture, packing and storing of food products, compiled by British authors and from British publications. Its editor is also the editor of *Food Manufacture*, the leading food journal in England.

Its editorial content is directed to the food chemist and particular emphasis is placed on dairy products and on chocolate, jams and jellies. It should prove to be of considerable value to those who, for any reason, might be contemplating the British food field.

Labor Amity

WHEN FOREMAN AND STEWARD BARGAIN. By Glenn Gardiner. Published by McGraw-Hill Book Co., 330 W. 42nd St., New York 18, N. Y., 1945. 6x9 in.; 194 pages; cloth. Price, $2.00.

To get results through people is the first requisite of any supervisor. This book, one of the McGraw-Hill industrial organization and management series, is written with that requirement constantly in mind.

Since the union steward has become an integral part of the employee picture, the foreman must learn to deal with him. The author, however, hastens to point out that the book is not written for foremen, who merely want to win arguments with stewards, or is there any desire to help the foreman take advantage of the union steward. In fact, the emphasis throughout is on the foreman's opportunities to develop good human relations in an unionized

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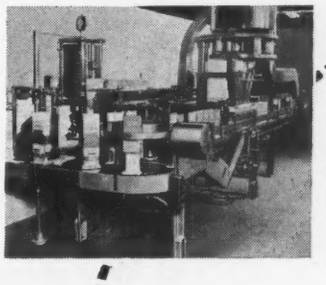

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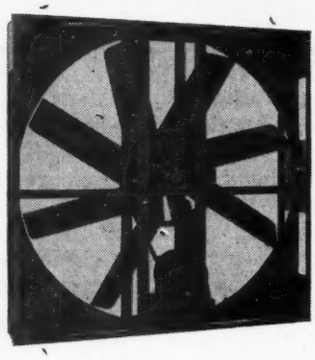

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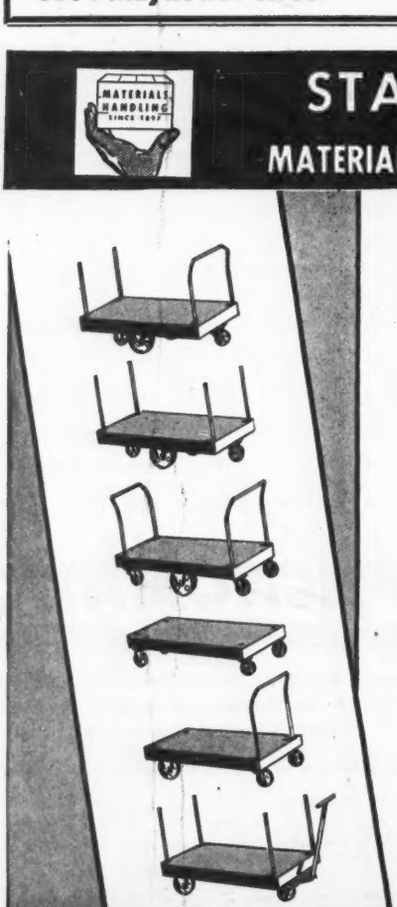

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workforce through a constructive and cooperative relationship between foreman and steward, and thus, between company and union.

Federal Contracts

MANUAL OF PROCEDURE UNDER GOVERNMENT CONTRACTS. By O. R. McGuire. Published by Fidelity & Deposit Co., of Maryland, Baltimore, Md., 4th Edition, 1945. 5x8 in.; 87 pages; paper. Free.

The food industry will continue to negotiate government contracts, even though peace has been restored. This manual, therefore, should be of considerable help in clarifying a great many procedures. It also sets forth ways to avoid many costly errors, based on false assumptions as to what constitute proper procedures.

GOVERNMENT PUBLICATIONS

A SELECTED AND ANNOTATED BIBLIOGRAPHY ON SOFT CORN AND PERTINENT INFORMATION ON THE DRYING, PRESERVATION, AND STORAGE BEHAVIOR OF CORN AND OTHER GRAINS. By Carol M. Jaeger, J. H. Shollenberger, and M. M. MacMasters. Bureau of Agricultural and Industrial Chemistry, AIC-100. Mimeographed. Free from Bureau of Agricultural and Industrial Chemistry, Washington 25, D. C.

CATALYTIC CONJUGATION OF LINSEED AND SOYBEAN OILS. By S. B. Radlove, H. M. Teeter, and J. C. Cowan. Bureau of Agricultural and Industrial Chemistry, AIC-101. Mimeographed. Available free from Bureau of Agricultural and Industrial Chemistry, Washington 25, D. C.

LIVESTOCK, MEATS, AND WOOL MARKET STATISTICS AND RELATED DATA 1944. Production and Marketing Administration, CS-14. Mimeographed. Available free from Office of Information, Department of Agriculture, Washington 25, D. C.

GRADING SOFT RED WINTER WHEAT AT COUNTRY POINTS. Extension Service, AIS-33. Folder, illustrated. Available free from Office of Information, U. S. Department of Agriculture, Washington 25, D. C.

FACTORS AFFECTING CURLEY TOP DAMAGE TO SUGAR BEETS IN SOUTHERN IDAHO. By D. E. Fox, J. C. Chamberlin, and J. R. Douglass. Bureau of Entomology and Plant Quarantine. Technical Bulletin, 897T. Available from Superintendent of Documents, Washington 25, D. C. Price 10 cents.

PAPER SHIPPING SACKS. Federal Specification, UU-S-48a. Available from Superintendent of Documents, Washington 25, D. C. Price 5 cents.

PATENTS

CEREALS AND GRAINS

Popcorn Confections Mechanically Formed Into Predetermined Shapes and Sizes—Benjamin Atkinson, Salt Lake City, Utah. No. 2,388,815. Nov. 13, 1945.

Soya Flour Used as Base for Free-flowing, Non-caking, Readily-dispersing and Caustic Alkali-free Adhesives—Chester L. Baker, Narberth, Pa., and Robert H. Sams, Upper Darby, Pa., to Philadelphia Quartz Co., Philadelphia, Pa. No. 2,392,302. Jan. 8, 1946.

Wheat or Rye Milled To Separate Germ From Friable Endosperm Prior to Grinding or Breaking Up of Grain Berries—Robert J. S. Carter, Minneapolis, Minn., to Pillsbury Mills, Inc. No. 2,392,365. Jan. 8, 1946.

DAIRY

Bulk Ice Cream Made To Have Contrasting Flavoring Material Irregularly Dispersed Without Loss of Identity—Nevin J. Russell, Wauwatosa, Wis., to Robert A. Johnson Co., Milwaukee, Wis. No. 2,392,698. Jan. 8, 1946.

Whole Milk Powder Made by Separating Cream From Non-fat Milk Constituents, Condensing and Heat-treating Skim Milk Portion, Heat-treating Cream Portion, and Recombining Prior to Drying—Gerald C. North, Evanston, Ill., and Alvin J. Alton, Chicago, Ill., to Beatrice Creamery Co., Chicago, Ill. No. 2,392,401. Jan. 8, 1946.

DEHYDRATION

Residual Moisture Removed from Dehydrated Fruit Concentrate by Addition of Water-soluble Salt of Carboxymethyl Cellulose—Ramon Perech, New York, N. Y. No. 2,393,561. Jan. 22, 1946.

FATS AND OILS

Dry Powdered Shortening Made by Encasing Particles of Edible Shortening in Natural Buttermilk Solids—Gerald C. North, Alvin J. Alton and Lawrence Little, to Beatrice Creamery Co., Chicago, Ill. No. 2,392,995. Jan. 15, 1946.

Dry, Siftable, Non-greasy, Free-flowing and Water-dispersible Shortening Made by Covering Fine Particles of Fat With Coating Made From Milk Solids and Water-absorptive Hydrophilic Agent Prior to Drying on Revolving Heated Drums—Gerald C. North, Alvin J. Alton and Lawrence Little, to Beatrice Creamery Co., Chicago, Ill. No 2,392,994. Jan. 15, 1946.

Dry Siftable, Readily Water-dispersible Shortening Made by Coating Finely Divided Particles of Edible Fat With Milk Solids and Edible, Water Absorptive, Hydrophilic Agent—Edward K. Chapin, to Beatrice Creamery Co., Chicago, Ill. No. 2,392,833. Jan. 15, 1946.

Glycerin Extracted From Fermentation Residues—Frederick R. Balcar, Stamford, Conn., to U. S. Industrial Chemicals, Inc., New York, N. Y. No. 2,392,569. Jan. 8, 1946.

Small Percentage of Lecithin Added to Refined Vegetable Oil Preliminary to Winterizing—Leo C. Brown, to Industrial Patents Corp., Chicago, Ill. No. 2,393,744. Jan. 29, 1946.

FRUITS AND VEGETABLES

Oil-free Citrus Fruit Juices Obtained in Non-oxidizing Atmosphere — Ronald B. McKinnis, Winter Haven, Fla. No. 2,393,475. Jan. 22, 1946.

Root Vegetables Mechanically Conveyed and Washed in Continuous Manner—Gregory M. Dexter, Scarsdale, N. Y., to United States Sugar Corp., Clewiston, Fla. No. 2,393,596. Jan. 29, 1946.

MEAT AND POULTRY

Sausage Mixtures Extruded Through Plural, Elongated, Open-ended Dies Into Non-casing Containers Having Predetermined Weight Content—William Muir Yuill, Edinburgh, Scotland. No. 2,393,853. Jan. 29, 1946.

PACKAGING

Food Packaged in Sterilized and Waterproofed Containers Under Aseptic Conditions—Sylvester Clyde Lehman, Jersey City, N. J. No. 2,392,395. Jan. 8, 1946.

Leakage Indicator for Containers Closed by Sealing Cap—Robert N. Shoner, Fort Wayne, Ind. No. 2,392,778. Jan. 8, 1946.

SUGAR AND STARCH

Gypsum-free Hydrolysate From Previous Runs for Making Dextrose Added to Starch and Sulphuric Acid-suspension—Walter R. Fetzer, Clayton, Mo., to Union Starch & Refining Co., Columbus, Ind. No. 2,393,095. Jan. 15, 1946.

MISCELLANEOUS

Apple Juice Concentrated to More Than 75 Percent Solids Content by Evaporation From Surface of Coil Heated to 190 Deg. F., Rotating on Horizontal Axis, and Partially Submerged in Juice—Ray M. Laird, Rootstown, Ohio. No. 2,392,903. Jan. 1, 1946.

Beverage Constituents in Closed Containers Mechanically Mixed by Action of Rotative Table Equipped With Plurality of Shaker Units Disposed Around Edge—Charles H. Miller, Chicago, Ill. No. 2,391,066. Dec. 18, 1945.

Coffee Concentrate Made by Adding Water-soluble Salt of Carboxymethyl Cellulose To Extract Preliminary to Evaporation—Ramon Perech, New York, N. Y. No. 2,393,562. Jan. 22, 1946.

Dry Pectin Treated to Become Completely Dispersible in Water—Herbert T. Leo and Clarence C. Taylor, to Mutual Citrus Products Co., Inc., Anaheim, Calif. No. 2,392,854. Jan. 15, 1946.

Egg Meats Clarified by Gravity Flow Through Spherical Filter Operating on Overflow Principle and Fitted With Drain Opening and Removable Plug on Bottom — George F. Hodson, Oklahoma City, Okla., to Wilson & Co., Chicago, Ill. No. 2,393,633. Jan. 29, 1946.

Water Treated With Soluble Salt of Primary Aliphatic Amine To Destroy Algae Content—Hoyt M. Corley, to Armour & Co., Chicago, Ill. No. 2,393,293. Jan. 22, 1946.

CANADIAN PATENTS

Milk Dried During Passage Over Plurality of Horizontal Rolls in Vertical and Alternating Hot and Cold Relationship to Each Other — Harry I. Andrews, Darien, Conn. No. 432,056. Dec. 25, 1945.

Foods Cooked, Dehydrated and Cooled in Combination Self-contained Machine—Harmannus Karel de Weerth, Buenos Aires, Argentine Republic. No. 431,152. Nov. 13, 1945.

Cream Cheese Made by Raising Acidity and Lowering Viscosity of Cream Mix to Permit Separation of Curd and Whey by Centrifuging After Heating to at Least 135 Deg. F.—Oscar J. Link, Beaver Dam, Wis., to Kraft Cheese Ltd., Montreal, Quebec. No. 432,303. Jan. 1, 1946.

Ice Cream Made in Barrel Freezer Surrounded by Refrigerant Chamber and Equipped With Thermostatic Expansion Valve For Controlling Flow of Refrigerant—James T. Smith and Alexander L. Reiter, to Mills Industries, Inc., Chicago, Ill. No, 432,308. Jan. 1, 1946.

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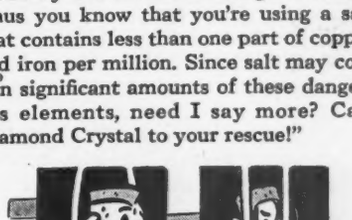

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Postwar Decisions

(*Continued from page* 103)

ent high level. Grocery store volume can be expected to decline also. But there will be at least four factors that may serve as a cushion, both for all-commodity food sales and sales of national food brands. These are:

1. The return of millions of men and women to civilian life.
2. With the reshuffling of population there will be a decline in eating outside the home.
3. Several million newly married couples will be establishing their own homes.
4. Any reduction in wartime taxes will increase spendable income.

Shifts in all food-commodity dollar sales by territories, as shown in Fig. 4, indicate that:

1. Total wartime changes are large, and greatest for Southeast, Southwest, Pacific.
2. Changes in the past year are small.

Perhaps postwar sales effort should be geared to take advantage of this.

Shifts in all-commodity dollar sales by store types and sizes are shown in Fig. 5.

The war period shows decided shift to the small store due to:

1. Increased income of consumers.
2. Fewer cars.
3. Tire and gas shortages.
4. Less time available for shopping.
5. Larger stocks (relatively).
6. Loss of mass display advantage of chains.
7. Less labor shortage.

Consumer dollar purchases of products sold through grocery and country stores have increased 89 percent since 1939. But only a 6 percent gain occurred during the past year. During 1945, the share of total grocery store sales represented by chain stores was lower than during previous years. With the war's end it is expected that the conditions, presumably responsible for the adverse chain store trend, will be corrected to a large degree.

Tonnage trends and dealer profits on 45 nationally advertised items in the total United States are shown in Fig. 6. This composite picture shows a marked increase in volume without corresponding dealer profits. The trends by specific brands vary widely. But the outstanding fact remains that national brands have forged ahead to about the same extent that these brands were available to the consuming public.

In the main, over a period of years, the sales volume of national food brands will be related to the level of

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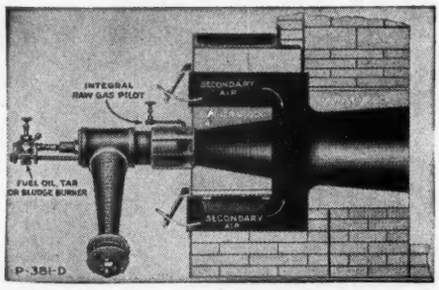

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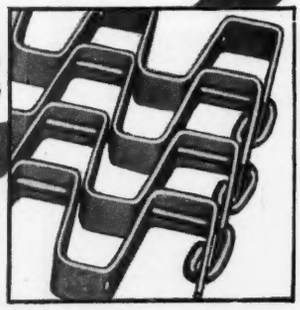

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consumer income. We have seen them rise above the level of all-commodity sales as grocery store sales kept pace with consumers' income during the war.

During these war years national food brands have passed through the greatest "sampling campaign" in their history. Higher consumer incomes in the hands of millions of more families have found an outlet in "trading-up" in the grocery stores. This "trading-up" has included more national brands and larger volumes of national brands, in free supply, than in prewar years.

Whether national brands as a whole can maintain this greater consumer distribution depends on whether or not the consumer can maintain the level of his income.

But during reconversion, present volume of national food brands as a whole may decline rather sharply because of temporary unemployment and uncertainty—this, despite the fact that consumers will have the largest volume of savings by the end of war than they have ever had.

Shifts in sales by income groups are shown in Fig 7, indicating:

1. Higher-priced brands gained in all income groups.
2. Percentage gains in share (for higher-priced items)
   - Upper ..... + 19 percent
   - Middle ..... + 26 percent
   - Lower ..... + 33 percent
3. Position in lower is now as high as was formerly obtained in upper group.
4. The problem is to retain as many of these "new users" as possible—especially if consumer income declines.

Possible postwar sales trends need correct interpretation. Fig. 8 illustrates what might happen to factory shipments in case consumer sales return to prewar levels in a year. There may be a sharp drop in factory sales while trade stocks are being adjusted to the new, lower levels of consumer demand.

The first and most natural thought, on suffering a drastic sales decline, is that you are losing volume to competitors. While this may be true, it may also arise from either a decline in the total market or a liquidation of excessive trade inventories. Both of these are almost certain to occur in the near future. In some cases, these declines will be due to decreased consumer demand arising from decreased consumer income. In other cases, they will be due to liquidation of excessive trade inventories that exist today in certain commodities.

Now there are limits to what any one manufacturer can do to either hold up the income of 140,000,000

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Top quality condition, essential to consumers' taste and eye even after extended storage and shelf-life, is a "must" that places heavy responsibility upon protective integuments. Only functional coverings, the end product of unusual skills and specialized equipment, can serve appropriately. Such are Rhinelander Protective Papers . . . keyed to package machinery operations, providing the minimum in weight and bulk while assuring the maximum in extended protection after economical conversion to wrappings, bags and liners. If your product, edible or otherwise, requires *flexible package protection*, Rhinelander's many years of "know how" is yours to command.

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consumers or prevent 400,000 retailers from liquidating an excessive stock position. Ordinarily, all you can expect to do is to maintain (approximately) your present share of what the consumer is buying. Remember, you may actually be achieving this at times when your factory shipments are dropping at an alarming rate.

So, unless some reliable form of marketing research shows clearly that you are losing your share of the available business, measured at the point of consumption, try to restrain the impulse to engage in desperate maneuvers that will only set off a destructive competitive spiral that may throw your entire industry into red ink. Examples of such tactics are:

1. Price-cutting of a type not justified by lower costs.
2. Deals of uneconomic types.
3. Advertising at uneconomic levels.

—End—

"Poor Richard"

(*Continued from page* 93)

job in the laboratory, waiting for something to come along that would enable him to improve his situation.

On the other hand, students from engineering and chemical engineering schools may set out to enter industry, and they usually have a definite type of work which they wish to carry on. The jobs awaiting them in industry are, as a rule, more clearly defined. They are generally prepared to do a specific job, and their training has given them a better background for their immediate problem than is ordinarily obtained by a man who enters the food industry, broadly trained in general science. Naturally, the salary will vary under such circumstances, and it is not always the fault of the industry that the man who is trained for certain fields of pure research in the university does not immediately find a good paying job in the industry and one suited to his particular training.

There are other factors that have operated in the past to make the food industry less responsive to research and the support of well-paid scientific jobs. The food industry was not born in the test tube. Many of its constituent industries have operated for centuries, before science stepped in. It has operated more independently of chemical science than the strictly chemical or engineering industries. Many of the advances of the food industry have been engineering and chemical, but the engineering usually came first. The

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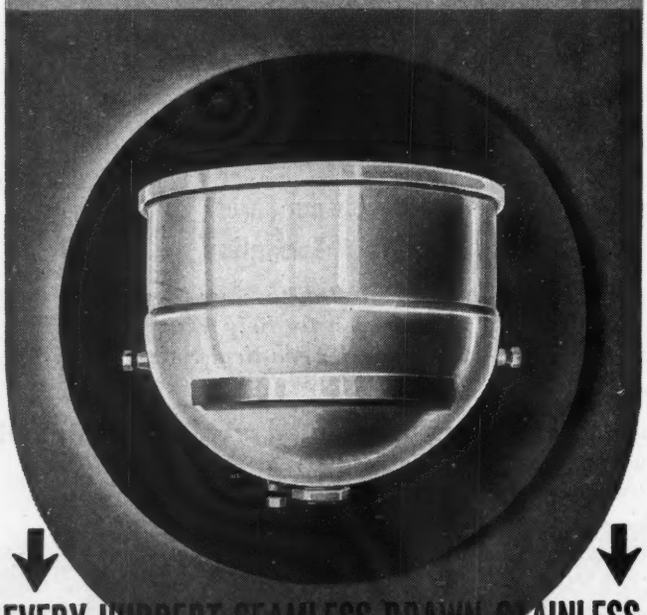

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fundamental research was not necessarily developed by the food industries, but by equipment or chemical manufacturers, or in university or government laboratories.

Much of the progress of the food industry involving chemistry, bacteriology, and engineering is built into the equipment which the processor buys. The food manufacturer also obtains much technical information from experts employed by the equipment manufacturer as to the operation of the machines he purchases as well as on the processing of his immediate material. Consequently, many food manufacturers do not rely on their own research, nor do they employ expert personnel on their own laboratory staff. They can operate with small control laboratories, manned by people with much less training than those required for research and development.

The management of food manufacturers, especially of the type mentioned above, has not always given a high place to the food technologist or the chemist, possibly because his responsibility was limited to rather restricted fields. Sales and other branches of the industry have received much better treatment. This situation certainly should be given serious consideration. Perhaps both the chemist and industry failed to recognize the scope of the responsibilities involved.

It seems that a serious question is also involved in connection with the purpose for which scientific societies operate. The scientific society furnishes a platform on which discussion can take place and science can be advanced. It is not believed that the chemical society, as such, or the food chemists' organizations should become merely professional organizations. Many members of the chemical society are not strictly professional people. This applies to the food chemists also. If we wish to deal with problems of salary, etc., it may be more desirable to found a purely professional organization such as exists among consulting engineers. The broad purpose of the scientific organization can best be carried out in an atmosphere devoid of too much professionalism.

A clergyman in a radio address has criticized the point of view (that liberty is more valuable to mankind than jobs) taken by representatives at the San Francisco Conference. In a complex civilization such as ours, he believes that jobs are of greater importance to the average man than freedom, for man must have his daily bread. This is certainly a startling statement and deserves the

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serious consideration of every man living in a democracy. The scientific man in industry, however, has not fallen to such a low estate, and may hope to consider some of the other values, or democracy has no meaning; but he, too, cannot forget his daily bread. His contribution is probably fully as valuable as that of management. Consequently, his future status and his salary requirements, based on his contributions and responsibilities to industry operating in a democracy, must be carefully evaluated.

Possibly each organization should appoint a strong committee to study the salary situation. An unbiased report by such a committee might be helpful and constructive.

—End—

Prepackaging Perishables

(*Continued from page* 105)

tards the dehydration, or loss of moisture, from fruits and vegetables. The higher the temperature to which harvested produce is subjected, the greater will be the loss of moisture and the quicker its deterioration. The belief that refrigeration alone is responsible for this longer life is incorrect. Most housewives now know that tomatoes, prepacked in cartons and cellophane, when placed in the refrigerator at home, will last twice as long as nonpackaged tomatoes.

The ideal refrigerated display counter is one that resembles the ordinary fruit and vegetable counters now used for display purposes, waist-high in front and banked toward the rear, with added side walls of glass and an open top, enabling the shopper to procure what she wants with the least possible effort.

But how can 40 deg. F., the most desirable temperature for keeping prepackaged perishables, be maintained in an open counter? With the present models of refrigerated cases, where prepackaged perishables are stacked five high, items at the bottom of the stack, where the temperature is 40 to 46 deg. F., keep better than those on top, where the temperature is 10 deg. higher. Furthermore, the moisture contained in the perishables, due to the cold air within the open display counter, causes condensation on the cellophane of the package. Drops of water on transparent packaging materials obstruct clear vision of the product within. Although such condensation might give a customer the feeling that she is buying dew-fresh produce, prepackaged perishables, free from condensation within the package,

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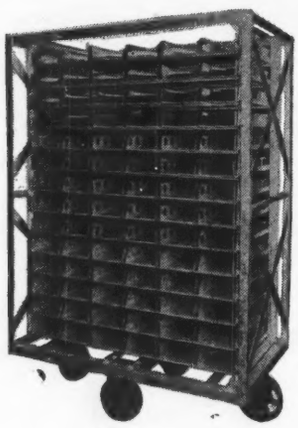

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will offer the most sales-appeal. Minimizing this condensation is an important consideration. Perhaps a slightly altered refrigerated case similar to the style now used for meat and dairy products is the solution. The ingenuity of the refrigerator manufacturers should be of assistance in solving these problems.

Then, there is the important problem of packaging materials. Standard materials, such as chipboard cartons and heat-sealing, moisture-proof, transparent cellophane are the most economical and probably will be adaptable to the prepackaging of perishables. Preliminary tests have shown, however, that prepackaging, in its infancy at least, will require some custom-fitted packaging. Different fruits and vegetables have various sizes and shapes and contain different amounts of moisture. Individual apples, containing about 67 percent moisture, will not require the same packaging as small blueberries that contain about 88 percent moisture. Blueberries, now packed in small wooden boxes, are softer than apples, and although both fruits will bruise when mishandled, blueberries are considerably more fragile. In prepackaging, apples can be individually nested, three or four to a container, while blueberries will have to be loose-packed. Individual wrappings on some fruits and vegetables will prevent bruising and the spreading of molds. Certain fruits and vegetables, having higher acidity (lower pH) than others, may require special types of protective packaging materials. It is thought, however, as long as the natural protective skins of produce are not damaged, the acidity of various fruits and vegetables will not be an important consideration.

Fruits and vegetables, being living things, respire, throw off CO_2 gas and absorb oxygen. Some air-tight packaging materials do not permit this breathing process to operate and thereby cause a rapid breakdown of the internal structure. Peas and beans in moisture-proof wrappers become slimy and scarred, with dark lines appearing on the pods. The tips on sweet potatoes rapidly become soft and seem to keep better when not packaged. Similarly, apples appear to keep as well, if not better, when not packaged. Care, therefore, must be exercised in choosing the proper packaging materials for the individual products. Some of the necessary packaging research has been completed, but much remains to be done. Practical experience will be a great teacher.

Eventually, all the prepackaging

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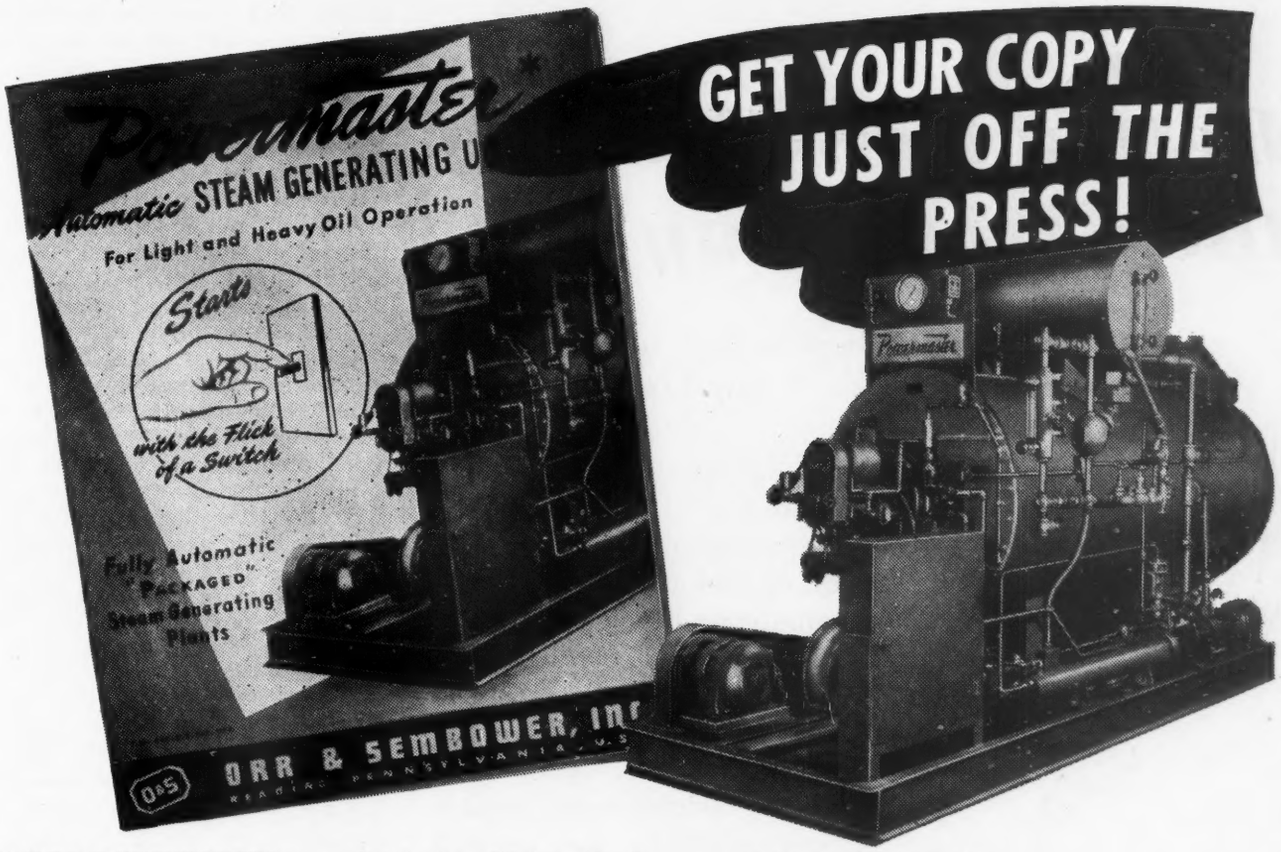
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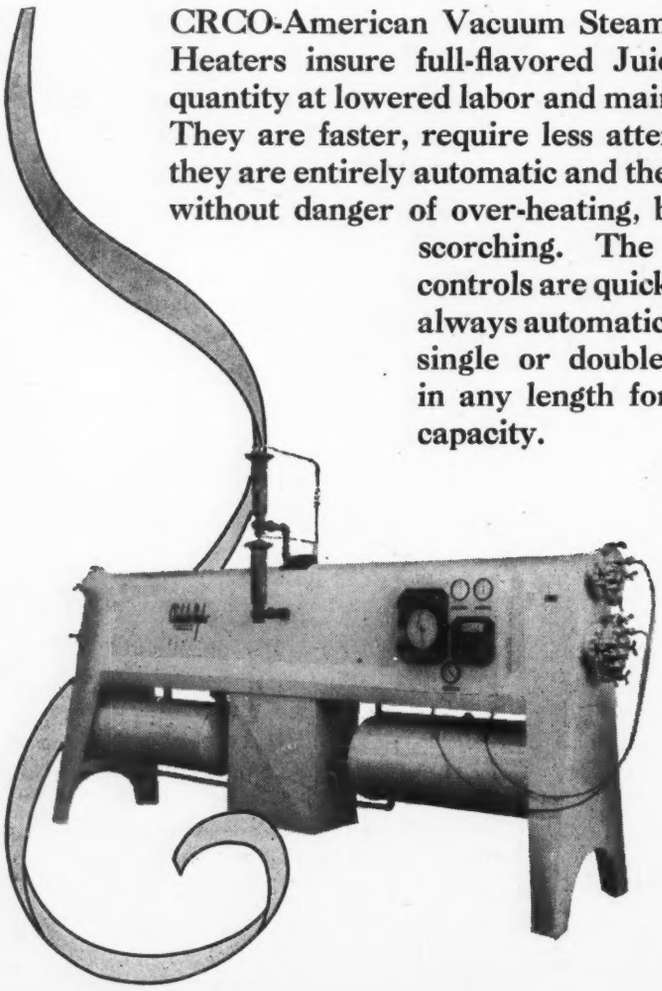

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FOR · THE · FOOD · PROCESSOR ·

work will be done automatically, and the machinery to form the carton and package the produce will need to be procured. Sizes of units will have to be considered and will be governed by the product and the quantity to be sold in one unit.

The customer will buy the quantity most suitable for her family. Carrots, for instance, are sold by the bunch. Will a package contain one or two bunches? Should the carrot-tops be included in the package or removed at the time of prepackaging? How much carrot-top is necessary for sales appeal? These questions can be answered only by experience. Carrots with tops removed sell well in certain markets, whereas other markets may require carrots with full tops attached. Other vegetables and fruits, too, will present similar problems.

The program of prepackaging perishables should progress rapidly. The larger chain grocery companies are attempting to solve their prepackaging problems by conducting their own research and setting up test grocery stores together with test packaging units in average communities. Their hope is to serve fresher, more nutritious, more sanitary and better tasting fruits and vegetables.

—End—

Trichinae

(*Continued from page* 88)

tests were carried out at this temperature.

Discussion and Conclusions

In the experiments reported, the rate of destruction of trichina larvae in fresh unsalted pork was directly associated with the temperature employed in the dehydration as well as with the amount of dehydration attained. In the case of experiments involving a temperature of 120 deg. F. the rate of dehydration was fairly constant and the larvae were all destroyed when the moisture content of the meat was reduced to 9 percent or less. At temperatures lower than 120 deg. F., however, the rate of dehydration was somewhat slower and varied more widely than at the higher temperatures, and some larvae survived greater reductions in moisture contents.

Results of a previous investigation showed that in the interest of good keeping quality, raw dehydrated pork should have a moisture content of not more than 2 percent[4]. As can be seen from the data herein presented, prolonged dehydration at tem-

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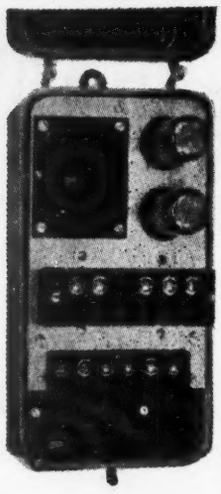

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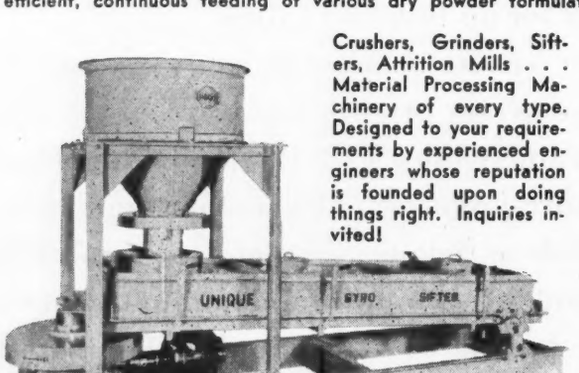

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peratures lower than 120 deg. F. is necessary to reduce the moisture content of the meat to 2 percent or less. Consequently, in view of this fact and the fact that in these tests trichina larvae exhibited considerably greater resistance to dehydration at temperatures of 102 deg. F. and 70 deg. F. than at 120 deg. F., it is considered that dehydration of pork at temperatures lower than 120 deg. F. by methods used in this investigation is not to be recommended as a practical procedure at this time. It seems reasonable to conclude that when a temperature of 120 deg. F. or higher is employed in dehydration, pork dried to a moisture level of 2 percent is quite safe, so far as danger of consumers acquiring an infection of trichinae is concerned. Even a moisture content as high as 7 or 8 percent would appear satisfactory from this point of view, when the dehydration temperature does not fall below 120 deg. F.

References

[1] U. S. Department of Agriculture, Bulletin No. 880, 1920.
[2] U. S. Department of Agriculture, Service and Regulatory Announcements, B. A. I. 393, January, 1940.
[3] U. S. Department of Agriculture, Circular No. 706, 1944.
[4] U. S. Department of Agriculture, Annual Report, chief, Bureau of Animal Industry, p. 4, 1944.

—End—

Gas Packing Milk

(*Continued from page* 99)

tion, a negative log-log linear relation would be expected between equilibrium oxygen percentage and time between gassings. Fig. 5 shows that such a relationship actually does exist. There is little advantage in using a time interval between gassings of more than 24 hours.

The exact procedure for double gassing may vary considerably. After the initial gassing and holding for the time desired, the sealed cans may be pierced to provide a 1 to 2 mm. hole, and the can then reevacuated, gassed and tip-soldered. A less laborious procedure is to evacuate and gas the powder in bulk, in drums or larger vessels, and after the holding period desired, to can and gas-pack the powder.

Carbon dioxide may be used instead of nitrogen either for pregassing or for the final gassing. It is immaterial which gas is used insofar as the actual oxygen content of the gas-packed powder is concerned. When carbon dioxide is used, however, it is especially important to calculate the oxygen content to atmospheric pressure. This is neces-

Trail-Aire Conditioner

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No army in the world had the variety of food that G.I. Joe enjoyed in this last war. Uncle Sam was constantly on the alert for something new that would contribute a greater variety to his menu at home and in foreign fields.

Rhode Island rushed forward with a highly acceptable addition. It was the *quahog*, that bivalve popularly known as the clam in all states except Rhode Island and Massachusetts.

Immediately after the Quartermaster Department flashed the green light, quahog fishermen began furnishing the government with 7,500 gallons of deep sea quahogs every week.

G. I.'s clamored for more. Shipped frozen in cans to our fighting forces in Europe and the Pacific, the quahogs made such a hit that 80,000 gallons, enough to feed 3,000,000 soldiers, were shipped last year in Truck-Trailers from Rhode Island to Norfolk, Virginia and San Francisco, California.

Early in 1943 the Narragansett Bay Packing Co., Warren, Rhode Island, recognized that the quahog was a highly profitable commercial commodity. Largely through the use of their fleet of refrigerated and air-conditioned Fruehauf Trailers, the company is able to assure safe, swift transportation of these perishables even in the hottest weather.

Fishermen, too, say that these Fruehaufs — "refrigerators on wheels"—have made it possible for them to tap an undeveloped source of food supply and revolutionize marketing methods of shellfish.

If you aren't fully familiar with the economies of the Trailer method of hauling, by all means get the story from your nearest Fruehauf representative.

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WHO PAYS FOR THE ROADS?

The roads were built and are being maintained with motor vehicle tax money. And even if you ride in buses or taxis, you have paid more than your share. Government studies show that truck owners *overpay* from $5.00 each for farm trucks —up to $287 each for truck-trailers of over 5-ton capacity for their use of the roads.

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A TRUCK IS LIKE A HORSE — IT CAN PULL MORE THAN IT CAN CARRY

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Do You ---- emulsify, thicken, stabilize, suspend or gel ?

We offer two seaplant extractives which may prove to be the answer to your emulsifying, suspending, thickening or stabilizing problems:

KRIM-KO GEL—an all-purpose colloid-assistant which, with improved techniques of use, can prove effective in practically all food, pharmaceutical and industrial applications.

CARRAGAR:—an agar-type gelatin which forms tender, fruit-like gel over a wide pH range. Does not require acidulation to produce desired results.

Both products are now being successfully used by nationally known manufacturers in many fields. Write for literature, and any desired specific techniques.

FREE! Write today for sample of new agar-type jellying agent!

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SCITUATE, MASSACHUSETTS

In a post War world like we are now experiencing, many things will come to pass that will mean great or small loss to a large number of companies. We are referring to new and untried products being developed by new and untried companies.

It will pay you well to remember when buying new equipment that the reliable company building reliable products will be able to help you not only in this hectic period, but will be ready to serve you in the years ahead.

Write today for Bulletin Series 46SE which illustrates and describes the complete line of Viking rotary pumps.

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sary because dry milk absorbs considerable quantities of carbon dioxide. If carbon dioxide is used in the pregassing treatment, part of the carbon dioxide is absorbed and on later gassing with nitrogen is desorbed to increase the total pressure to above atmospheric. If powder not previously treated with carbon dioxide is gassed with carbon dioxide, part of the carbon dioxide is absorbed by the powder to create a partial vacuum in the can.

If the cans are single or double gassed with nitrogen, the pressure should be approximately atmospheric. If gassed with carbon dioxide followed by nitrogen, they will be considerably above atmospheric. We have noted pressures as high as 900 mm. (760 mm. equal atmospheric pressure). If gassed with nitrogen followed by carbon dioxide, they will be below atmospheric pressure, possibly lower than 400 mm. Powder containing sufficient oxygen to give an equilibrium oxygen level of 2.0 percent, when gassed with nitrogen so as to be at atmospheric pressure, would yield cans testing 1.7 percent at 900 mm. and 3.8 percent at 400 mm. Since the total oxygen contents would be the same in all instances, the percentage of oxygen in the head-space gas might be very misleading unless corrected to standard pressure.

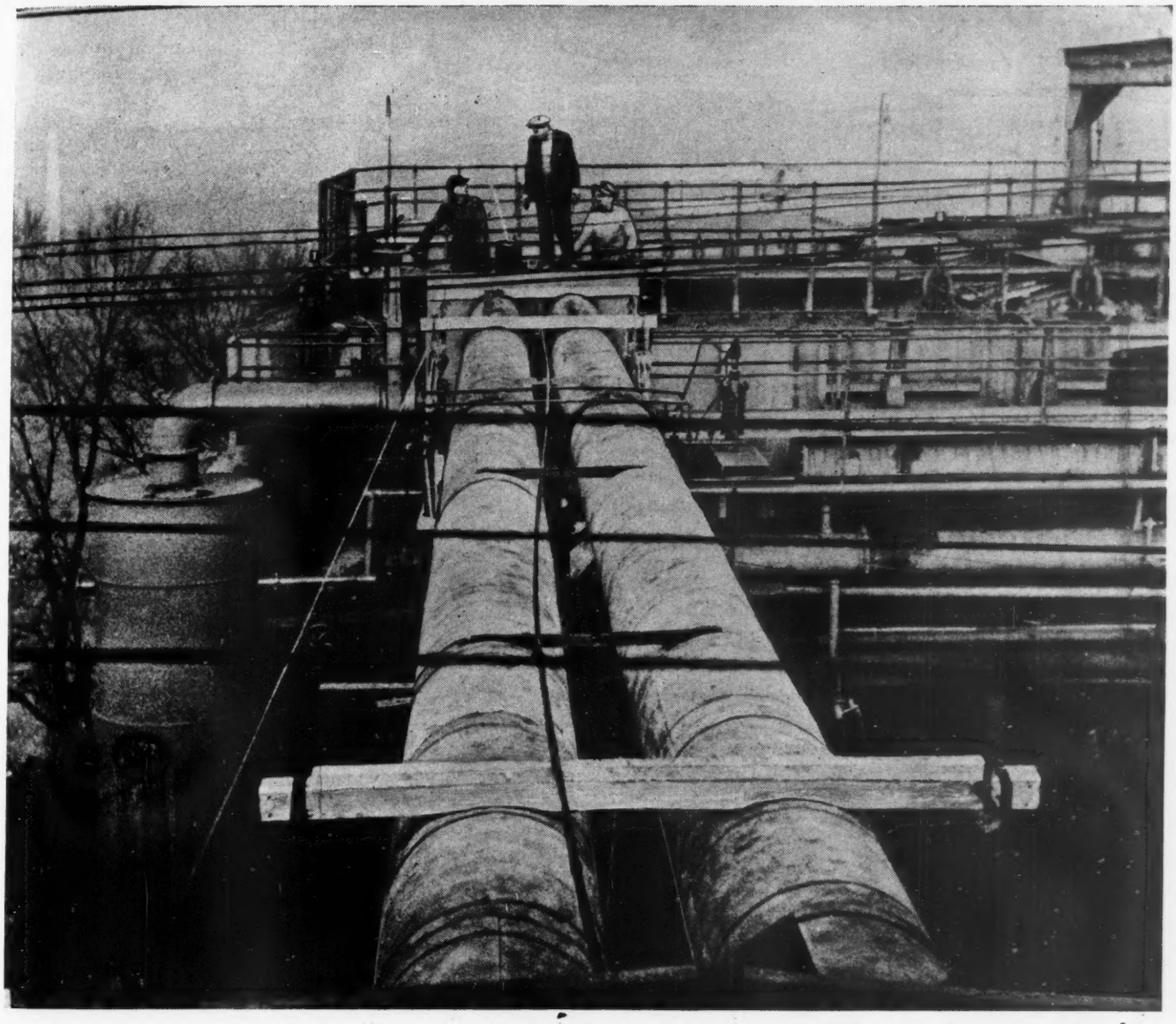
2. *Vacuum Holding.*

As shown in Figs. 6 and 7, the oxygen content of the powder may be lowered just as effectively by holding the powder under a vacuum as in an atmosphere of nitrogen for a comparable length of time. The rate of diffusion of the oxygen from the air cells of the powder particles to the surrounding space is dependent upon the difference in the partial pressure of the oxygen rather than upon the total difference in pressure.

Any suitable chamber, sufficiently gas-tight so that a vacuum can be drawn and maintained, may be used. As shown by the data in Table II, the vacuum may be released with air rather than nitrogen if the powder is canned and gas-packed without delay. Diffusion of air back into the cells begins immediately upon exposure to air, hence the advantages of vacuum holding may be lost by undue delay. *Exposure of the pre-vacuumized powder to the air for as little as 30 minutes will materially increase the 7-day oxygen analyses.* This procedure is the most economical since it requires *no more nitrogen than does single gassing.*

3. *Use of dry ice.*

The oxygen content of the space surrounding the powder particles may be reduced by introducing dry



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Predictions of "continued cold" can mean serious trouble—unless pipes are adequately insulated. Fiberglas Industrial Insulation, furnished in forms to meet every interior and exterior requirement, is helping industry avoid the costly effects of weather changes and extremes.

During a natural gas shortage, a West Virginia concern built its own gas-producing unit. Efficient operation was aided by the application of Fiberglas insulating blankets, pipe covering and insulating cement. Moisture condensation in two 18-inch gas lines, which had caused severe pressure drops, was eliminated by insulating more than a mile of lines with Fiberglas pipe insulation. And this same highly efficient thermal insulation, installed on outside water lines, prevented freezing.

The illustrated booklet, "Fiberglas Insulations for Industry", will give you complete information about all of the forms of Fiberglas Industrial Insulation materials. Write for your copy today. Find out how this better material can help you "beat the weatherman" and save money. *Owens-Corning Fiberglas Corporation, 2009 Nicholas Bldg., Toledo 1, Ohio.*

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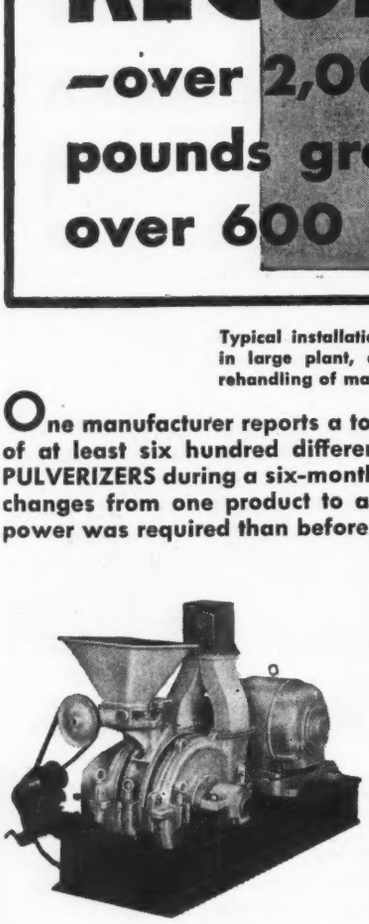
A SIX MONTH'S RECORD —over 2,000,000 pounds ground of over 600 products!

Typical installation of Stainless Steel No. 2TH MIKRO-PULVERIZER in large plant, discharging directly to mixer below, eliminating rehandling of material.

One manufacturer reports a total of over two million pounds of material of at least six hundred different products ground in their five MIKRO-PULVERIZERS during a six-month period. In addition to making these quick changes from one product to another without contamination, less manpower was required than before.



THE MIKRO-ATOMIZER

A new mechanical screenless pulverizer for producing ultra-fine powders of 1 to 25 micron particle size.

The complete ease and quickness with which a MIKRO can be cleaned, makes possible such records and advantages. And, with their small tolerance of particle-size limits, the MIKRO adequately meets today's demand for finer and more uniform products.

Accurate particle-size control, elimination of dust, lower operating costs, and the fact that every MIKRO is built to suit a particular application—have caused more and more firms to turn to it as the answer to their difficult reduction problems.

Our test grinding facilities are available without cost or obligation. Send for your copy of Confidential Test Grinding Data Sheet.

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NOW...2 TYPES TO MEET MOST PULVERIZING NEEDS

MIKRO-PULVERIZER (FINE)

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ice into the containers, usually drums or barrels.

The subliming carbon dioxide partially replaces the air. As much as 3 to 5 lb. of dry ice per barrel of powder may be used. Whether the dry ice is distributed in chunks throughout the barrel or is placed in one piece at the top, bottom or middle of the barrel, does not seem to be material. Since the air is not positively replaced, the use of dry ice to reduce the final oxygen level in the gas-packed powder is less subject to control than is double gassing or vacuum holding.

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1. J. H. Hetrick and P. H. Tracy. Factors Affecting the Oxygen Content of the Gaseous Phase of Packaged Whole Milk Powder. *Journal Dairy Science*, 27, 685-686, 1944.
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4. P. F. Sharp. Seeding Test for Crystalline Beta Lactose. *Journal Dairy Science*, 21, 445-449, 1938.
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—End—

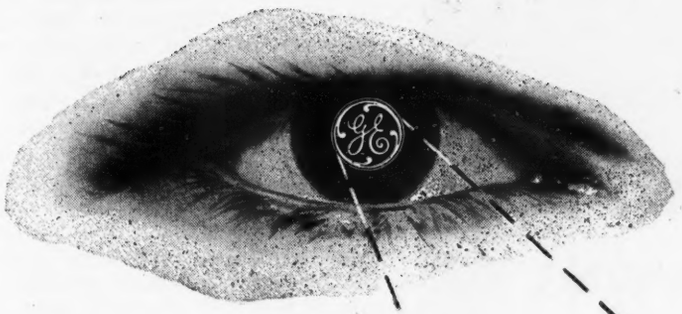
Compressed Foods

(*Continued from page* 108)

provided for in-package desiccation and to replace the air by an inert gas, such as carbon dioxide or nitrogen. As cool a storage space as it is feasible to provide will be of advantage. A temperature of 50 deg. F. or a little lower would probably be satisfactory and, in most cases, this would call for very little refrigerating capacity. Stocking by the retail dealer should, as far as possible, conform with daily needs so that the exposure period may be reduced to a minimum. In any case, extended holding on the retail shelf should be carefully avoided.

Block Dimensions

Mention was made of the importance of food block dimensions as affecting reconstitution and it should now be considered briefly from the standpoint of merchandising. During the war, owing to the necessity of providing for overseas needs, few blocks, smaller than 3 x 5 x 1½ in., were considered, and some of them intended for camp kitchen and institutional use were considerably larger. We now need to think of the matter from the standpoint of the individual family, which in many cases consists of only two or three persons. There will be no advantage in the use of compressed foods for such families if the package is so large that it cannot be used in its entirety promptly. A pound



What to look for in refrigeration . .

Keep your eye peeled for that familiar G-E symbol. On a condensing unit—the heart of all refrigerating equipment—it means modern, compact design . . . steady, economical operation . . . long life.

And *these* days it means a lot more, too. Your G-E distributor or contractor will help you keep your present unit running until there are enough G-E Condensing Units to go around. He'll help you analyze your refrigerating needs in the light of your future plans and prospects.

When you do get the G-E Condensing Unit you're waiting for, your G-E distributor will always be there, ready and willing to give you the kind of service that has made G-E a name to depend on in refrigeration. *General Electric Company, Air Conditioning Dept., Section* **6893**, *Bloomfield, New Jersey.*

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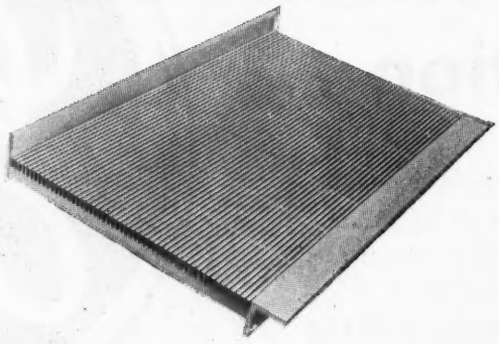

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Hendrick manufactures perforated metal screens for many different food processing operations — stainless steel screens for food equipment and sizing operations — screens for sizing mushrooms — wedge slot screens for screening food wastes — screens for oil foots — screens for sizing of all kinds of nuts and many other food products. Write for complete information today.

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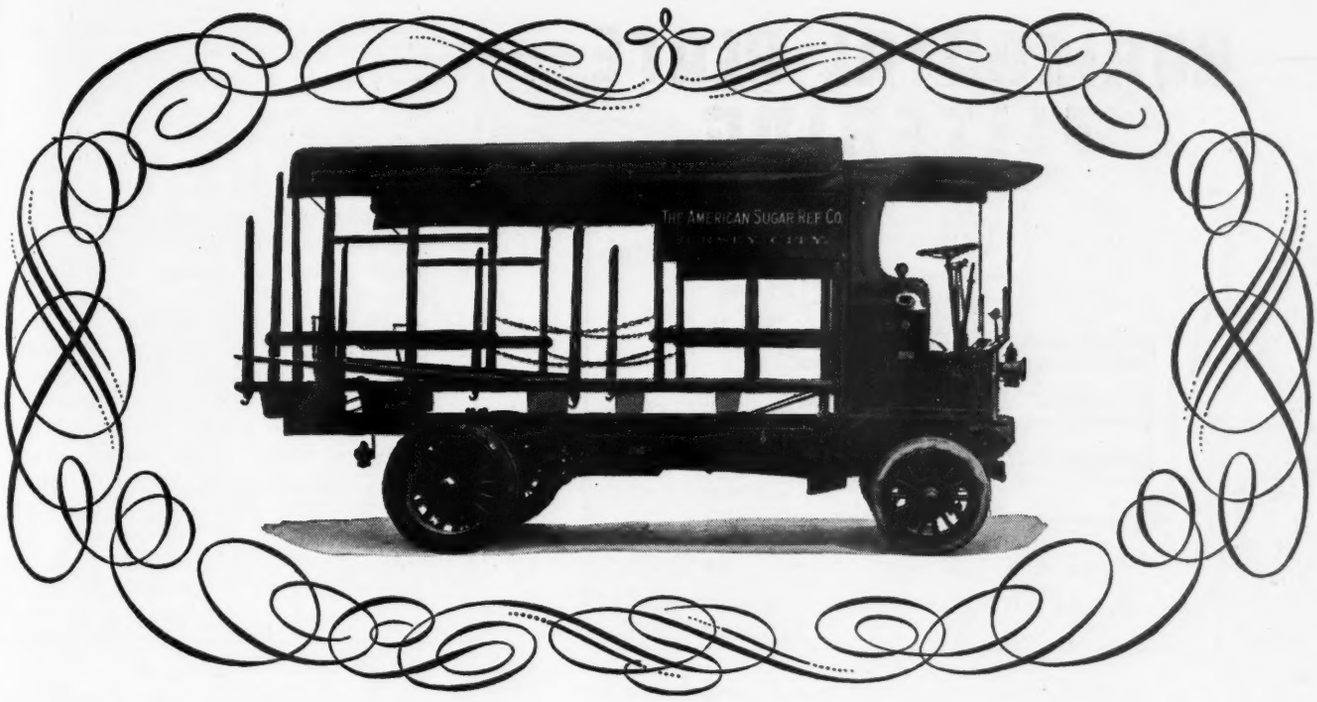
package of a dehydrated food represents a very considerable bulk when it is reconstituted, ordinarily more than the average housewife can use at one time. Unless the product, therefore, is one that does not deteriorate perceptibly within a reasonable time, it will be necessary to pack at least part of the output in smaller units so that quality may be maintained and there will be no occasion for waste. Some food products do not change in quality appreciably within a considerable period and these can be marketed in larger units.

Concerning the matter of small-sized blocks, however, there is one angle of the problem that must not be overlooked. This is the fact that American housewives are accustomed to considerable bulk in food purchases and there are many who will doubtlessly hesitate to pay what is really a reasonable price for a small package of food even if it does contain the equivalent of a much greater bulk. Suitable labeling, to indicate fresh food equivalents, should help in the solution of this problem. This, however, is likely a matter that will adjust itself when users come to realize that high quality is maintained, losses from wastes are avoided, and the product represents real worth.

The next consideration is price. It is hardly to be expected that compressed dehydrated foods of high quality will, for a while at least, be low in price, and there are several reasons why. In the first place, raw materials of superior quality are required for their manufacture and these cost more than those of lower grade. Furthermore, the costs of preliminary treatments of the raw material, of dehydrating, compressing, packaging and warehousing must be added to those of the raw materials. These will, of necessity, be reflected in the sales price of the product. However, with mass production conducted at centers in close proximity to raw material-producing areas, with constantly improving manufacturing technology, with smaller storage space requirements due to reduction in bulk and with lower transportation costs, as compared with those of other types of processed foods, the differential should not be excessive. Considering the absence of waste, the ease of storage and the convenience in use, the prices will appear justified, providing, of course, the products possess high-table quality.

In conclusion, the experiences of World War II have taught us the tremendous importance of dehydrated



THEN . . . "Down by the Old Mill Stream" was a brand-new song when the American Sugar Refining Company loaded up its first Mack Truck. That was back in 1910.

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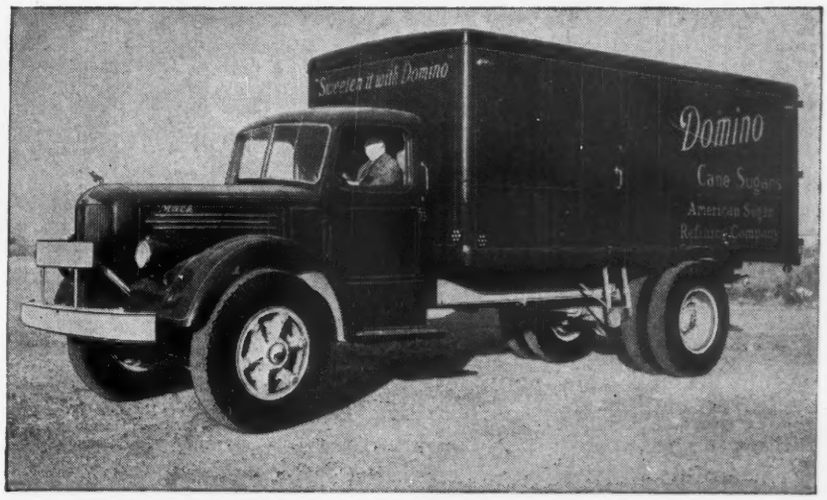
Mighty modern Macks still haul the products of the American Sugar Refining Company. Today's Macks are the result of 45 years of experience in building trucks that stay on the job and out of the repair shop . . . that do more work at lower overall cost. That's why, for nearly half a century, Macks have remained the year-after-year choice of so many long-established and successful companies.



American Sugar Refining Company uses MACK

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FOR EVERY PURPOSE

PERFORMANCE COUNTS

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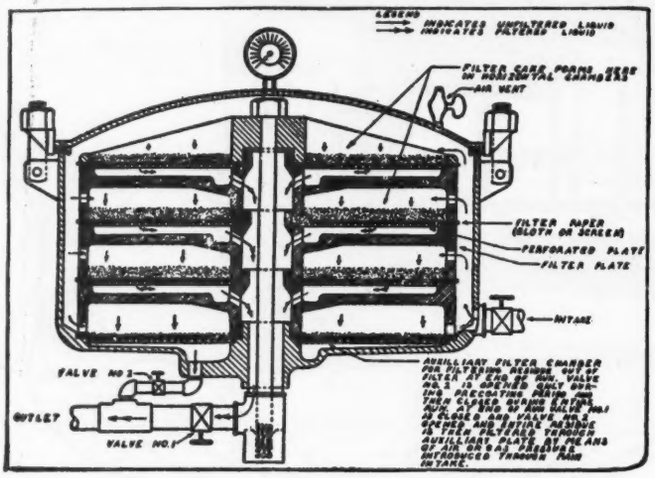

means higher quality food products.

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You get valuable point of sale appeal when your package combines *good looks* with utility. Let our packaging engineers design and make . . . to your order . . . distinctive, original packagings—attractive and protective.

Anything you market . . . including frozen foods . . . can be packaged in our new 1946 line of wrappings, bags and envelopes; utilizing cardboard, plain or printed glassine, cellophane, pliofilm, laminated papers, etc.

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foods. They have filled a need for which there was no other answer. There have been poor ones, there have been good ones, and all have been put to a severe test. In spite of some failures, and some ridicule, they nevertheless served and will continue for some time, at least, to serve the needs of millions of people. It is inconceivable, therefore, that with the return of peace we should throw overboard all that we have learned of this means of meeting an emergency or fail to build upon the foundation of solid achievement that has resulted from these endeavors. Dehydrated foods will not displace fresh foods, canned foods, or frozen foods, but will find a substantial and permanent place for themselves, and that, on the basis of real and appreciated worth. Compression will give them a unique advantage, through economy and facility in marketing and in sales appeal.

—End—

Human Feeding

(*Continued from page* 74)

amount of direct evidence on this important point was small. From many directions, those who were then concerned with the plans for providing food for the days of liberation were pressed to provide enormous stocks of vitamins. We were told that all vitamin deficiency conditions were widespread. A decision had to be taken, as in the early days of our own food plans, whether the situation called for such special provision or whether it could be met by supplies of ordinary food.

The Real Problem

In the first place, our analysis of the estimates of the food production of the occupied countries, even after allowing for German depredations, indicated that the agricultural population would have plenty to eat. Except under famine conditions, that is always true. The farmer and the peasant rarely go short. You can bully them, threaten them or punish them, but nothing short of shooting them will stop them keeping and hiding food for their family's needs. There was, therefore, in our opinion, no need to worry about the population of the countryside or, for that matter, about the people in the small towns closely in touch with the land. The larger towns were the real problem.

The basic fact was, of course, that the official rations in the towns were inadequate for the needs of the body. In France and Belgium the situation was that the rations supplied about

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•

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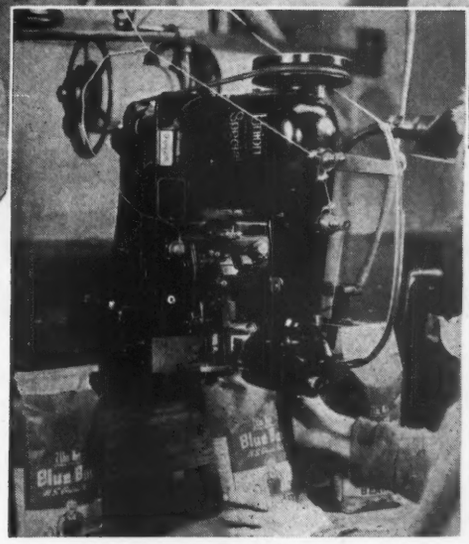

. . . produced by the 60000 D Sewing Head

Here's an effective, economical way to smiles of satisfaction from the food processor, the retail distributor and the individual customer! It's *really good packaging*, characterized by the finest type of bag closure. The Union Special DUBL-TAPE CLOSURE is sturdy, tight, economical to produce, eye-appealing, easy to open. It is the ideal closure for small paper bags, from 1 lb. to 25 lb. size. The 60000 D sewing head, which produces this closure, applies a strip of paper tape to each side of the bag top, runs a secure stitch through the tape and trims the bag top. This is all done simply, at low cost and automatically results in a strong, firm package. Write today for details on this and other equipment for closing all sizes of paper and fabric bags. UNION SPECIAL MACHINE COMPANY, 450 North Franklin Street, Chicago 10, Illinois.

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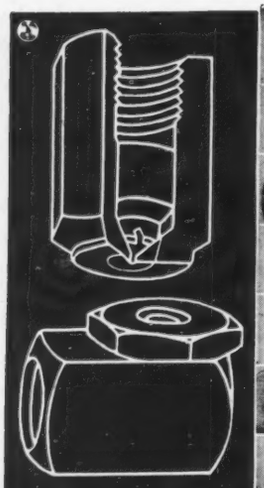

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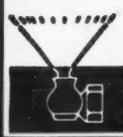

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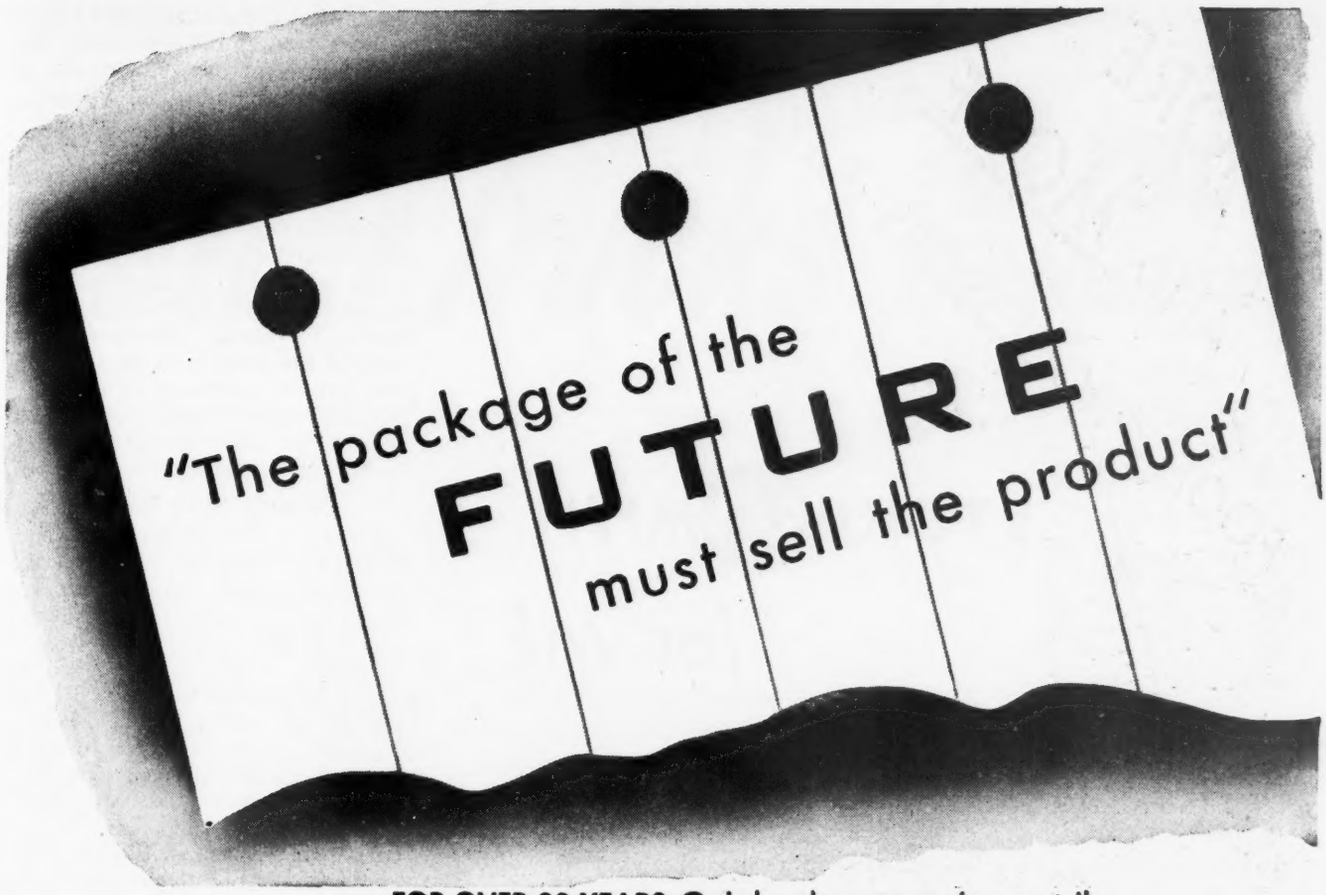
one-half the estimated requirements for energy. Moreover, an analysis of the rations revealed other nutritional deficiencies, which, if they actually existed, would have aroused anxiety. How did we fill in the detail of this broad picture? Secret intelligence failed to give us the information we needed, but we found an invaluable clue in the literature.

Calorie Deficiency

In the early days of the war, a paper appeared in the *Journal of Nutrition* in which was described an investigation carried out by a group of scientists, under the auspices of the Rockefeller Foundation, in an industrial suburb of Madrid. A careful dietetic and nutritional study was made of this group of poor people, who for a long time had been subsisting on the verge of starvation. The calorie value of the daily diet was about the same (1,200 to 1,400) as those of the rations of the ordinary consumers in the occupied countries. What did the investigators find? Adults were underweight, easily tired and apathetic; children were thin and spindly and there was a fair amount of anemia. But, surprisingly little evidence was found of gross deficiency disorders. What was the explanation? Because they were hungry, these people ate all the vegetables they could lay their hands on. Their bread was rough but nutritious. As a consequence, the broad picture presented by these people was primarily one of calorie deficiency, with associated shortage of protein. It seemed to us that this picture could be accepted as a reasonably good model on which to base our plans for relief of western European towns. It turned out that we were not far wrong in so deciding. You will recall the surprise of our men when they invaded France and followed up through to Belgium and found the countryside so well-provided with food. We had guessed that would be so and we were right. The farmer always lives well. But what did they find when they got to the towns? With the exception of western Holland, late in the campaign, nothing that remotely resembled serious malnutrition.

In the large towns of northern France a ration of 1,200 to 1,400 calories had been supplemented by the people to the extent of about 600 to 800 calories daily. The additional food had been acquired by all sorts of means, duplicate and false ration cards, black market purchases, food parcels from farms, barter and expeditions to the nearby country.

Analysis of these wartime diets



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Appealing, appetizing designs will sell the product. This Sunshine Fancy ASSORTMENT is printed in full color right on Gair Patent coated paper board. Another famous Gair design and product. Write for Printers' Ink article by Egmont Arens industrial designer in which this Package appears.

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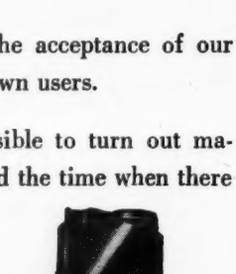
In common with most manufacturers, we find it impossible to turn out machines fast enough . . . and we're looking hopefully toward the time when there will be enough S & S machines to meet the demand.

Today more and more customers tell us . . . "I'm *glad* to wait for a Stokes & Smith."



THE TRANSWRAP PACKAGING MACHINE . . . forms, fills and seals the package, taking the printed or unprinted web from the roll—at speeds of from 50 to 100 packages per minute, depending on size of package, kind of web and nature of material. Ideal for packaging coffee (steel cut, Silex ground or pulverized), candy, popcorn, nuts, crackers, powders, granular materials and miscellaneous articles. Write for illustrated folder.

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"Better machines for better packages"

shows that their nutritional value in respect to vitamins was good. Many people in France were actually getting more thiamin and vitamin A than their prewar diet provided. In consequence, health was fairly good. People were thin but not seriously so. The young children had been well-cared-for and were in good shape. Older children, particularly those between 9 and 14, showed clear signs of retarded growth, due primarily to calorie deficiency, a good deal of the protein of their diet being lost for purposes of growth by being burnt for energy. To this same cause can also be attributed the rather prevalent mild anemia.

Belgium More Deficient

Following the victorious armies' march into Belgium, much the same conditions were encountered — the people of the countryside reasonably well-fed, the towns calorie-deficient. Generally speaking, the deficiency was more marked than it had been in the French towns. This is understandable when the agricultural pattern of Belgium is borne in mind. It is less easy to acquire large quantities of dairy produce, potatoes and garden vegetables in the vicinity of the large Belgian towns than it is in France. In Brussels, on liberation, adults and children were found thinner and more gaunt than those seen in Paris. I estimated the average daily calorie intake at about 1,600, after allowing for food over and above the ration.

Going further north, into the corridor forced by our troops in the direction of Arnhem, the situation became more grave. In towns such as Eindhoven, people could get little more than 1,000 calories a day. Faces were drawn and grey and there was everywhere apparent the curious lethargy and apathy that characterizes grave calorie deficiency. The Civil Affairs offices could not understand why the liberated Netherlanders were at first so slow to help them to reorganize the life of the towns. When later, the calorie value of the rations was raised to 1,500 daily, a remarkable change came over the people. Apathy passed and initiative reappeared.

Eat Tulip Bulbs

But, there is a limit to the extent to which a simple diet of nutritious bread and vegetables can protect the individual against major defficiencies. It was nearly reached in the Dutch corridor in November, 1944, and it was passed in the western Netherlands in the latter part of that grim winter.

You will recall that the brave re-

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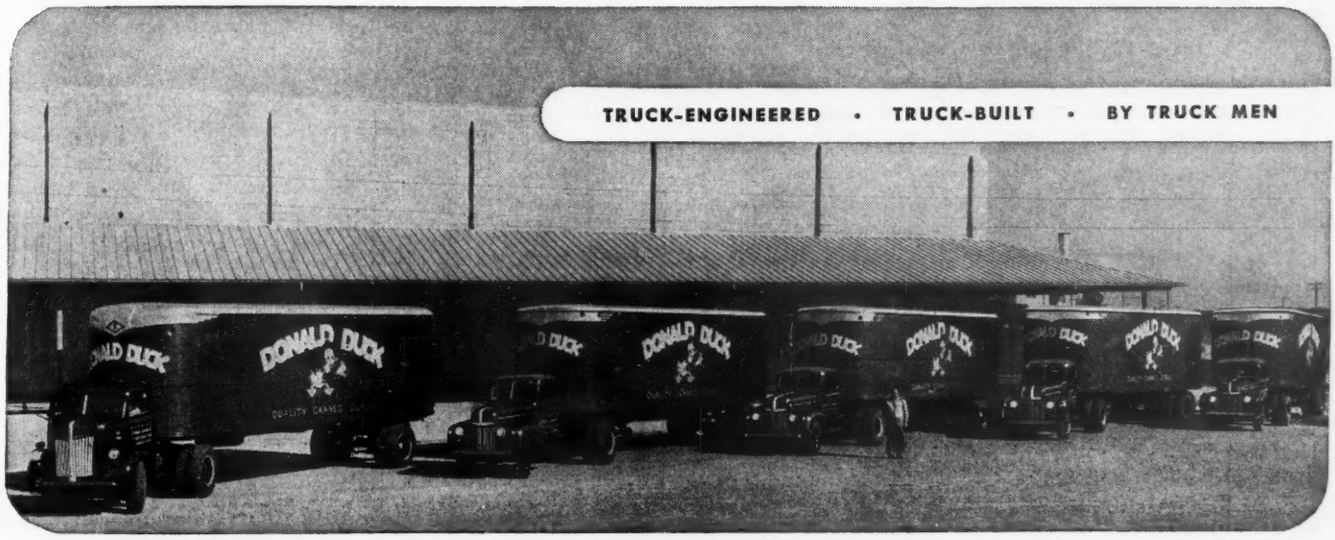

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Operators like it. Mr. O. H. Heath, Dept. Supt., Florida Citrus Canners Cooperative, Lake Wales, Fla., writes:

"We have used Ford Trucks, for their power, for over twelve years, in all types of service—single trucks and tractor-semi-trailer jobs. We believe nothing compares with them, and intend to add new Fords to our fleet, when and where necessary."

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A STILL GREATER 100 HP V-8 ENGINE with NEW Ford steel-cored Silvaloy rod bearings, more enduring than ever in severe service • NEW aluminum alloy cam-ground 4-ring pistons for oil economy • BIGGER, more efficient oil pump and IMPROVED rear bearing oil seal • NEW longer-lived valve springs • NEW improvements in cooling • NEW efficiency in ignition • in carburetion • in lubrication • in ease and economy of servicing operations • And available in all truck chassis except C.O.E. units—the rugged, thrifty 90 HP FORD SIX-CYLINDER ENGINE, with many important advancements.

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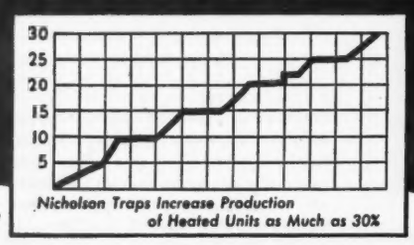

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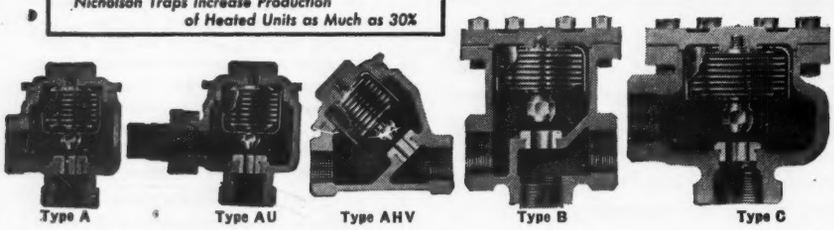

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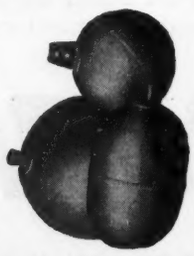

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sponse of the Netherlanders to the Allied Commands' call for a railway strike and for sabotage of communications, at the time of the first attack on Arnhem, brought reprisals that quickly led to the people of the western towns being starved.

I was one of those privileged to be associated with the Netherlands military government in making arrangements to rush food to the starving people of Amsterdam, Rotterdam, The Hague and Utrecht as soon as supplies could reach them. Behind the 1st Canadian Corps, we were making our plans as the news from inside the enemy lines became more and more grave. By February, we knew we would have to deal with mass starvation, for the daily allowance of food provided a mere 800 calories. By April, the figure was reported to have fallen to 600 and large numbers were known to have died in the towns from starvation.

Feeding the Starving

We sought advice on the treatment of severe starvation, but got little clear indication of what should be done. Although in our lifetime, millions of human beings have died from the effects of starvation, few were able to offer specific advice on its treatment. We were obliged to accept two assumptions and, in the end, both proved to be wrong. One was that individuals who are at death's door from lack of food cannot swallow. The second was that the processes of digestion are seriously impaired. Accordingly, very large quantities of predigested protein (casein and meat hydrolysates) and glucose reinforced with thiamin, riboflavin, niacin and ascorbic acid were prepared in forms suitable for administration either intravenously or by nasal tube. I am glad we also took the precaution of providing large quantities of spray dried separated milk powder. Without the latter we would have been in great trouble.

With capitulation of the German forces, this aid was rushed to the Dutch towns by mobile columns of feeding units organized and trained by the Netherlands Red Cross. Every one was needed. Rapid surveys indicated that, in a population of 3,500,000 people, at least 250,000 in the big towns were in a serious condition from shortage of food. If the Germans had held out another three weeks or a month a terrible disaster would certainly have occurred in the western Netherlands. The very grave cases were rushed into emergency hospitals for treatment. Hundreds

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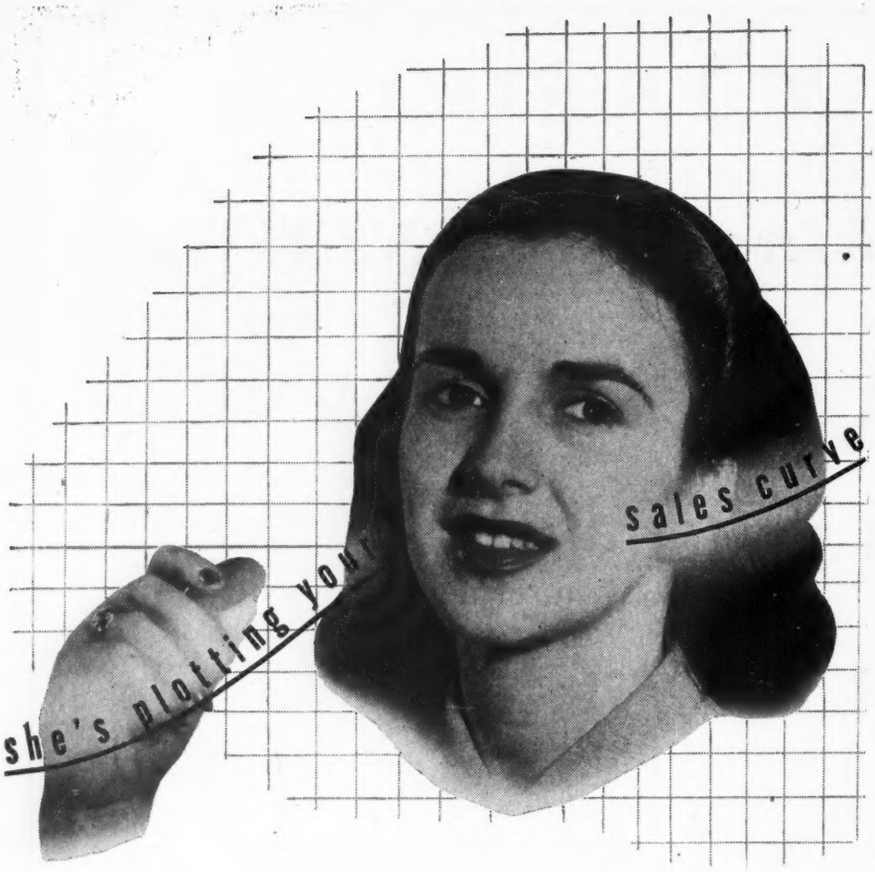

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Try it. Experimental samples may readily indicate how the keener taste appeal of Ethavan can be reflected in an upward sales trend. Contact the nearest Monsanto Office, or write: MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri. District Offices: New York, Chicago, Boston, Detroit, Cincinnati, Charlotte, Birmingham, Los Angeles, San Francisco, Seattle, Montreal, Toronto.

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were almost moribund on admission.

Then, came the proof that both our assumptions had been wrong. It was found, with rare exceptions, that the use of protein hydrolysates was unnecessary. Patients almost in the last stages of collapse from starvation could take sips of separated milk and were soon able to drink quite large volumes. What was equally important, they were able to digest it. It is true that the oral administration of hydrolysates produced good results, but they were in no manner superior to those following the giving of milk. It was found that very high protein and calorie intakes were necessary to achieve rapid recovery from oedema and other effects of severe starvation. By the second or third day of treatment, patients were getting 250 to 300 g. of protein and 2,500 to 3,000 calories daily, mainly in the form of separated milk.

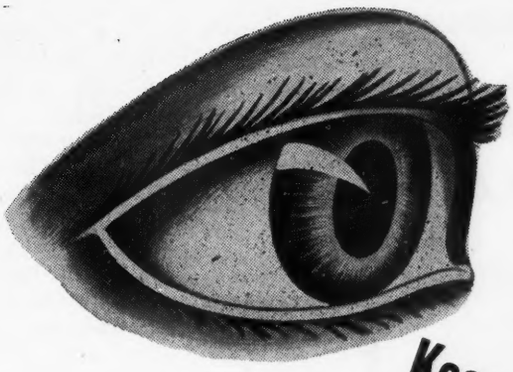
Among these people, we did see a variety of nutritional disorders. Hunger oedema was the most common; about 25 percent of the people examined in the large towns such as Rotterdam showed symptoms of this condition. The natural tendency was to associate it in our minds with the extremely low-protein intakes, but laboratory studies failed to establish a clear-cut relationship between the oedema and the blood-protein picture.

There were also indications of a fairly widespread incidence of mild riboflavin and niacin deficiency. A very prevalent diarrhoea was thought, by some of the experts, to be in a large measure due to a nutritional deficiency.

Here was the picture of the last stage of dependence on a diet consisting almost solely of bread, potatoes and vegetables. As long as it provided a reasonable proportion, say 60 to 70 percent of the calorie needs of the body, it was probable that grave malnutrition would not follow. At lower levels of consumption, few consequences of a serious character were seen until the protein intake was so reduced as to cause retardation of children's growth and interference with hemoglobin formation.

Less Food Needed

From these experiences in Europe, certain impressions seem to stand out quite sharply. In the first place there is, I believe, strong evidence, from those mass experiments in nutrition confirming the observations of F. B. Benedict and his colleagues, made 25 years ago, that at reduced calorie intakes the adult body, after losing a certain amount of weight,



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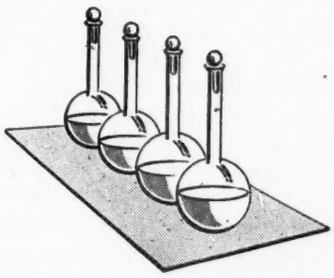

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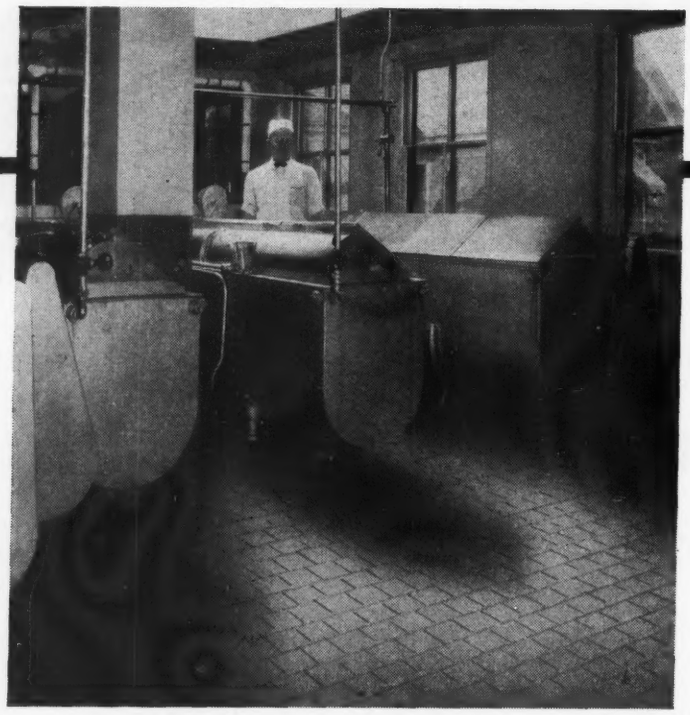

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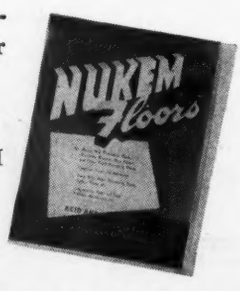
NUKEM floors can be installed by any competent workmen under our supervision. If preferred, we will furnish all labor, in addition to material and supervision. The nearest NUKEM representative will be glad to submit recommendations on your floor problem. Write or wire for his address.



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adjusts itself to a lower metabolic level. The comprehensive investigations recently made by Dr. Ansel Keys and his colleagues at Minneapolis give further support to this important conclusion. The data from the countries that were occupied by Germany suggest that adjustment occurred, among the town populations, where they had lost 15 to 20 percent of their original body weight and that at this reduced weight they could get along fairly well on daily intakes of 1,600 to 2,000 calories.

Needs a Plan

But there is one deep and vital impression to be gained from reviewing the European experiences during these hard years. It is that the people of these lands have realized, in the lean times they have been through, that national nutrition needs a plan. In one way or another, they have done all in their power during the German occupation to look after the expectant mothers and the young children. The merits of a nutritious form of bread, black and unappetizing as it was during most of that time, are far more widely recognized today than before the war. There will undoubtedly be important developments, now that peace has brought reorganization of the national life to the forefront. We, in Great Britain, do not intend to lose the ground we have gained during the war. The government has already taken many important steps in the direction of making permanent the special measures introduced as part of the wartime nutritional plan. When the new scheme for family allowances comes into force, every school child in the United Kingdom will be entitled to free milk and a free, hot midday meal, if its parents so desire. That is to be part of the allowance "in kind." Moreover, the government has announced its intention of continuing and expanding the measures by which the vulnerable groups are benefited. That will mean a continuance of the national milk scheme. It is also certain that in Great Britain we shall never return to the use of a white flour of the type of low nutritive value generally consumed before the war. And I believe, Holland and Norway, France and Belgium will each move in somewhat the same directions. There are already clear indications that they propose to do so.

If this movement develops and gathers strength in Europe, as I believe it will, the world will have derived at least one great and lasting benefit from the terrible years through which it has recently passed.